TOOLING & PRODUCTION Magazine

AUGUST 1958

Titanium Breakthroughs
by E. Willard Pennington 35

Salvaging Waste Sheet Metal Stock
by Joe Harner
Neat tricks — and sensible ones — to help make a profit out of stock 'left over' from press operations 37

626,700 Pieces Can't Be Wrong
by A. Chambers, A. Dunn, A. E. Glen
A 43" x 60" carbide die is made for blanking 626,700 practically burr-free laminations . . . 40

Nomograph for Machine Cutting Time
by W. O. Becker
A fast-working tool, for your notebook, to aid in making speed, feed, and time calculations . . 43

How Much 'Wrench Pull' Do You Use . . . On Your Wheel Sleeves?
by Ralph N. S. Merritt
A lesson on how to lessen the danger of wheel breakage by using a torque wrench 45

Many New Machines Unveiled at Two Summer Shows 48

What Business Has Done and Can Do for the Economy
R. S. Ingersoll
Thomas J. Watson, Jr.
Cloud Wampler
Charles G. Percy
Elisha Gray II 9

Machine Pads Cut Costs and Vibration, Improve Performance . 50

The Septuple — A Production Giant . 51

Survey of Newer Brazing Alloys . . 58

Electronic Press Drive Improves Speed and Cycling 61

Thread Inserts Reduce Broach Cutter Failures 62

Industry's Tooling Practices Not So Modern 64

Automated Welding Cuts Costs . . 70

Programming for Different Parts . . 74

1500-Ton Press Uses Portable Feed . 78

Testing Magnetic Chucks 117

Clean Air from Controls 117

A Job for the Atom 118

One Ram Stroke Forms Large Vessel Closure 121

Gas Fired Unit Draws Axle Flanges . 123

Departments in This Issue
Coming Events 30
Publication Previews 80
Products on Parade 90
Shop Aids 114
What's New in Plastics 124

Atom smashers are made as accurately as they are big . . . to the point of having a huge *carbide* die made to produce laminations for just *one* set of magnetic cores. Get the details on page 40.

Talk to

Snyder

TOOL AND ENGINEERING COMPANY

3400 E. Lafayette, Detroit 7, Michigan

Special Machine Tools with Automation for More Than 30 Years

HARDINGE
ELMIRA, N.Y.

MASTERS and PADS

FOR BETTER PERFORMANCE — BETTER PRODUCTION

AND

PROFITS

STYLE "S"
MASTER COLLETS and PADS
The Only Master Collet with
No Work Pressure On The Screw
Available For: Cleveland-Cone
Greenlee—Gridley and Acme-Gridley
National Acme—New Britain
Warner & Swasey

Write for FREE Bulletins

STYLE "B"
MASTER FEED FINGERS and PADS
Pads Cannot Work Loose
No Screws — No Pins
Available For: Brown & Sharpe
Cleveland—Cone—Davenport—Greenlee
Gridley and Acme-Gridley—National Acme
New Britain—Warner & Swasey

Carried in Stock For Prompt Delivery at:
Elmira, Boston, Atlanta, New York, Hartford, Philadelphia, Rochester, N. Y., Dayton, Detroit, Minneapolis, Chicago, St. Louis, Oakland, Los Angeles, Toronto, Montreal

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 3

PRODUCTION PROTECTION

. . . use the only DIAMOND WHEELS with the PRESSURE-LOK®

PERFORMANCE BOND

THIS WHEEL IS A PRECISE DUPLICATION OF YOUR SPECIFICATION. WARRANTEED WHEN PROPERLY OPERATED. TO GIVE YOU THE LOWEST COST PER CUT OF ANY WHEEL.

PRESIDENT

THE PROPER BOND IS NECESSARY

To reduce carbide cutting costs to a minimum, every Diamond particle must constantly have sharp angular faces exposed to the work piece. Pressure-lok bond controls each abrasive grain just as long as facets of that Diamond present sharp cutting edges. Pressure-lok uses uniformly graded Diamond (no fines) of warranteed density in the world's finest bond.

be SURE . . . get PRESSURELOK®

HERE'S WHY PRESSURELOK WORKS BEST

Pressurelok is the best of Diamond Wheels because it scientifically combines warranteed amounts of graded Diamonds distributed in constant density throughout a perfect bond which wears uniformly at the ideal rate of Diamond wear.

REMEMBER:
We've Never Failed To Deliver.

US UNITED STATES DIAMOND WHEEL CO.

835 ILLINOIS AVENUE AURORA, ILLINOIS
CIRCLE INFORM-A-GRAM KEY NO. 4

TOOLING & PRODUCTION Magazine

AUGUST 1958
VOL. XXIV No. 5
GEORGE J. HUEBNER, Founder

PERSONALLY SPEAKING

Dear T&P Reader:

Occasionally one has the rather fortunate experience of viewing something that is exceptionally impressive for the simplicity of its reasoning. Something of that sort happened to our editorial staff yesterday when Jordan Wood of the Jones & Lamson Machine Company dropped in and gave us a private showing of a new motion picture film entitled "The Price of Eggs". He could easily add to that title "or Cheaper by One Thousand and One Pieces per Day".

You may wonder what the price of eggs has to do with machines or manufacturing. Actually, there is no real connection although this movie uses the consideration of egg prices as a starting point for a line of reasoning. And the final conclusion results in proving the truth of J & L Company's slogan, "The man who needs a new machine tool is already paying for it."

If you are a shop operating man who knows that his plant would profit greatly through acquiring some new, modern machines, I'd strongly recommend that you view this new film, "The Price of Eggs". When you see it, I'm sure you will find that you can use it to help you sell your management modernization that you know your plant needs. And, don't overlook using it on your Company's Board of Directors if that distinguished group has to be sold before an order can be placed.

Incidentally, this film is exceptionally objective. It sticks strictly to its message; there are no commercials of any kind in it; it doesn't even mention machine tools. It does establish the economics of using machines that are fifteen years old and nine years old vs. brand new as of now. It applies equally to modernization with up to date machines virtually any place that machines are used. The running time is only 17 minutes and the potential of dollar savings through your company using its logic and reasoning could be enormous. If you want to see this film, drop a note to Jordan Wood, Jones & Lamson Machine Company, 519 Clinton Street, Springfield, Vermont and I know you will be afforded a very early opportunity to see "The Price of Eggs".

Cordially yours,

Ray Huebner

Publisher

READERSHIP RESEARCH — BPA

Business Staff:
R. L. Huebner, Publisher
P. E. Hager, Production Manager — B. C. Jackson, Research Manager
E. J. Brooks, Art Director — Mary Yoshida, Contract Manager

Editorial Staff:
E. Willard Pennington, Editor
Carl F. Benner, Associate Editor — Jeannette C. Traendly, Assistant Editor
William E. Hoffman, Associate Editor — Ernest J. Urbas, Contributing Editor
Carol E. Reuss, Associate Editor — Nyles V. Reinfeld, Contributing Editor

Editorial and Business Offices: 1975 Lee Road, Cleveland 18, Ohio, FAirmount 1-4040
Printing Office Address: P.O. Box 1494, Louisville, Ky. (For Plate Shipments Only)

Published Monthly by HUEBNER PUBLICATIONS, INC.

R. R. HUEBNER.....Chairman, Secretary, Treasurer

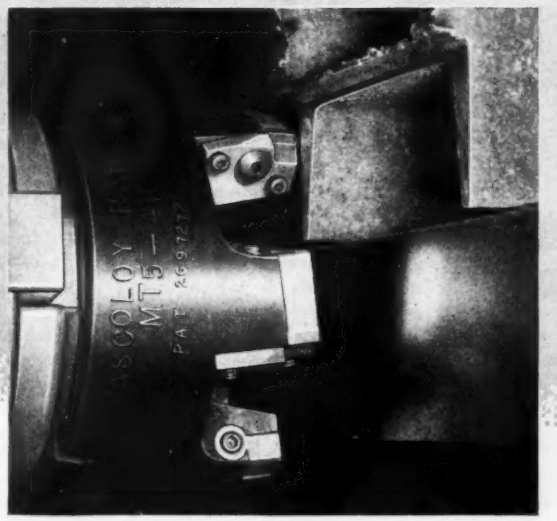
RAY L. HUEBNER.....President GEORGE J. HUEBNER, JR.....Vice President

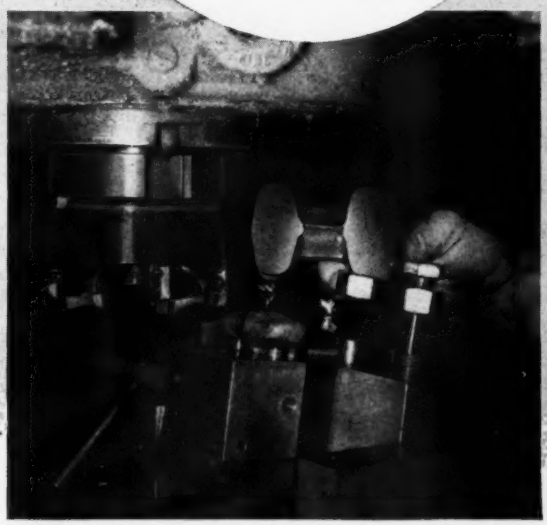
Copyright by Huebner Publications, Inc., 1958. Accepted as Controlled Circulation Publication at Shepherdsville, Ky. Single copies $1.00 each. U. S. subscription rate $2.00 per year for metalworking plant operating executive and department heads. All other subscriptions $6.00 per year. All foreign subscriptions, $10.00 per year.

USE V-R CARBIDES
for Greater Production

For
Milling Steel
VR-75
general purpose milling
VR-77
heavy duty milling

VR-54
for milling cast iron,
chilled cast iron,
non-ferrous alloys
and non-metallics





Make these three V-R Grades your first choice for increasing production and reducing downtime on your *milling* operations: VR-75 for General Purpose and VR-77 for Heavy Duty—for all types of steel, resists shock, abrasion and excessive heat. VR-54 for materials other than steel, incorporates toughness with high hardness to give the greatest possible resistance to abrasion and shock.

For complete information on the application of these three superior Carbide Grades, call your local V-R representative or field service engineer.

25 YEARS

MANUFACTURERS OF: CEMENTED CARBIDES, TANTUNG® CAST ALLOY CUTTING TOOLS, TOOLHOLDERS and THROW AWAY FACE MILLING CUTTERS

V-R

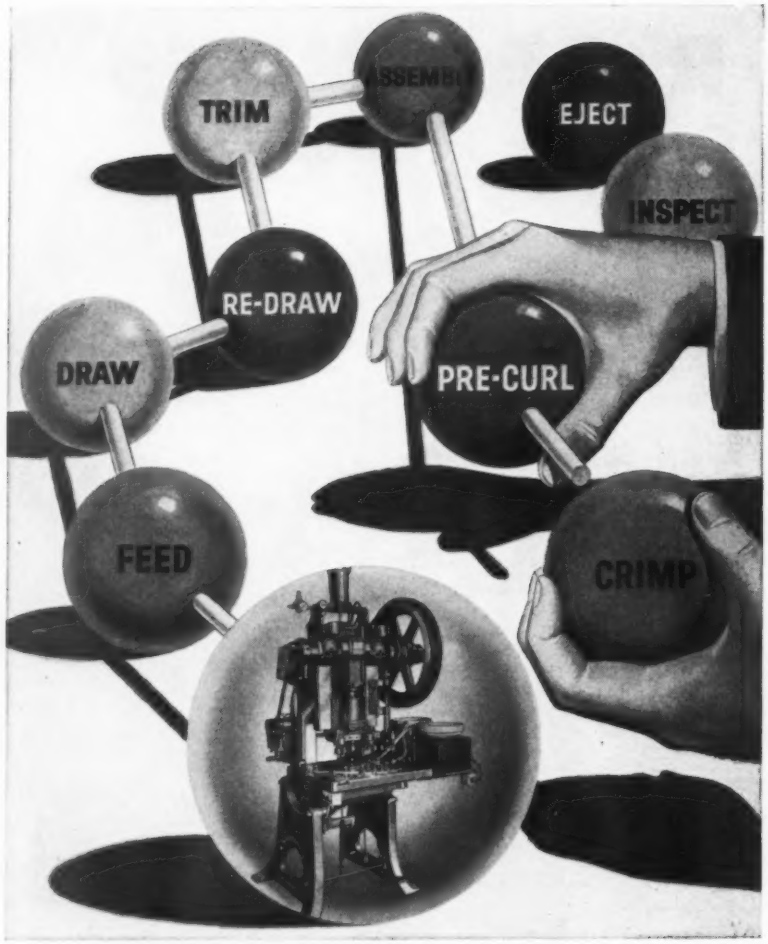
Vascoloy-Ramet Corporation

SUBSIDIARY OF FANSTEEL METALLURGICAL CORPORATION

882 Market Street • Waukegan, Illinois

C-669

CIRCLE INFORM-A-GRAM KEY NO. 5



V & O TURNS IDEAS INTO EQUIPMENT THAT REDUCES DIRECT COST

For example, on the press shown above, a washer and cup-shaped part are automatically fed, assembled, then joined by crimping. By integrating these operations on a single machine, V & O enabled the customer to cut direct costs on this component to a minimum.

Most important is the fact that this unit consists of a standard-type V & O press, equipped with standard types of vibratory hoppers.

Very likely you have some ideas on how you can cut your direct costs by integrating operations. We would welcome an opportunity to discuss them with you. Chances are that we have built an automated press that, in principle, comes close to your needs.

Presses, special equipment and methods that automatically reduce costs

EMHART MANUFACTURING COMPANY
THE V & O PRESS COMPANY DIVISION
421 UNION TURNPIKE • HUDSON, NEW YORK

CIRCLE INFORM-A-GRAM KEY NO. 6

"Commendable Comments"

"Our job is to whip the recession and get back on our economic feet. It is a job not for government alone, or business alone — but for business, government and every American. . . . Business has a responsibility to speak out, to express its views and stand firmly behind them. Business has an obligation to help devise and support the best possible programs to revitalize the economy, and beyond that to insure its healthy progress."

—Benjamin F. Fairless, president American Iron & Steel Institute, at 66th General Meeting of American Iron & Steel Institute.

"Man's progress has generally been dependent on the prior development of tools which made the new advances possible. The tools of progress included manpower, financial support, understanding, available materials, tools for producing new materials, and tools of measurement."

—R. F. Thomson, head of metallurgical engineering department, research staff, General Motors Corp., "Metals Review", January 1958 issue.

". . . the only practical way to keep foreign-made products from overcrowding our markets here at home is to compete on equal terms in quality, in price and in service; and . . . the only practical way to reach foreign markets successfully is to keep our costs — which means primarily our wage costs—competitive. . . . In the last analysis the only one who can fully protect the American workman is the American Workman himself. If he can keep wage costs from mounting while rising productivity brings our total costs into competitive balance with foreign costs, then truly I believe that he can expect to see the greatest era of prosperity our nation has ever known."

—Roger M. Blough, chairman of the board, U. S. Steel Corp., addressing annual meeting of Cleveland Chamber of Commerce.

"Makers of production equipment, including machine tool builders, must develop new models and new methods that are so effective that in spite of tax and tariff difficulties metalworking manufacturers simply can no longer afford to run their old machines, and must of necessity get the new ones."

—Alfred V. Bodine, president of National Machine Tool Builders Assoc., speaking before The Vickers Production Machine Tool Hydraulic Forum in Detroit.

PROVEN LONGER LIFE
PROVEN BETTER PRODUCTION

BENCO

model "A" master pushers with carbide pusher pads

You get more and better output with Benco Model "A" Master Pushers and carbide pads. Production runs in excess of 5,000,000 pieces have been achieved without changing pads or loss of tension of pushers.

Designed with "rocking ridge" in the pad recess, the Model "A" Master Pusher permits the pads to adjust themselves to full bearing on the stock. Thus scoring of the stock is avoided and feeding becomes more accurate. You will reduce your cost and get better production with Benco Model "A" and carbide pusher pads because no wear appears on the feed pad, therefore, no change in tension results and pusher troubles are eliminated.

For long life, for unmarked stock, Benco carbide pusher pads will far exceed the performance of any similar tool. The extremely low prices of carbide pusher pads will be returned to you many times in the savings they effect. You simply can't afford to be without them. For your short run jobs, very inexpensive pads are available for these master pushers in bronze, cast iron, hardened steel and meehanite.

Most sizes of Solid and Master Pushers, Solid and Master Collets for all popular automatics will be delivered immediately from stock. Send for price list and catalog.

BENCO COLLET manufacturing company

Cleveland 14, Ohio

CIRCLE INFORM-A-GRAM KEY NO. 7

New!

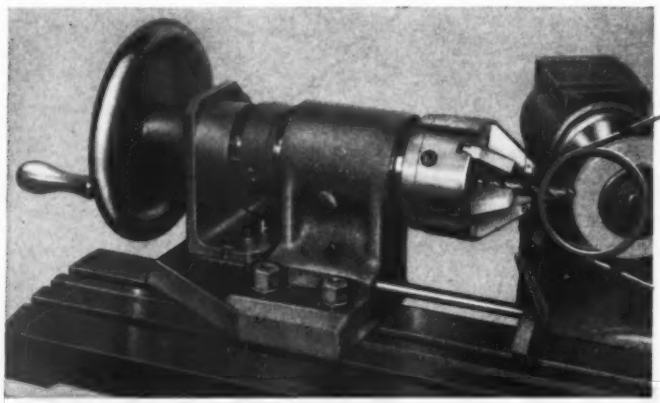
TRU-KUT POINT MASTER

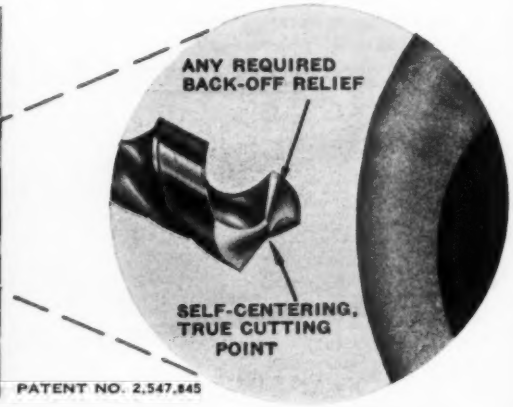
Produces and Reproduces "TRU-KUT" Points on Drills

EASIER . . .
FASTER . . .
LOWER COST . . .
CONSISTENT CUTTING POINTS

In many plants, the cost of producing drilled holes is one of the highest manufacturing expenses. Yet, over the years the inefficient chisel edge drill point with its large negative rake angle has remained virtually unchanged.

To secure more efficient cutting action at the drill point, tool room and production personnel frequently regrind chisel point drills by hand. But, hand grinding is costly, time consuming and results are seldom consistent.





PATENT NO. 2,547,845

NOW! Detroit Reamer & Tool Company offers the simple to use Tru-Kut Point Master—it is comparatively low in cost and eliminates the human variance factor. After quick and easy set-up, Tru-Kut drill points having any required cutting or relief angle can be duplicated time after time on the Point Master—and at a much faster rate of production.

The Tru-Kut Point Master can be used on most cutter grinders, Universal grinders and surface grinders. Standard grinding wheels are used. The front edge of wheel periphery is dressed to a radius that provides the self-centering "Tru-Kut" point.

Types of drills you can resharpen with the Tru-Kut Point Master for more efficient drilling are almost unlimited—crankshaft drills, sheet-metal drills, standard drills, step drills, etc. You can also grind lead angles and chamfers with radial clearance on taps; chamfers, end cuts and chip-breakers on 2-flute and 4-flute tools; chamfers and points on step-drills; thin-out webs at front; and gash cutting edges.

For additional design features, benefits, grinding, uses, etc., write to:

Tru-Kut Drill Points Assure:

- Rounder Holes
- Straighter Holes
- Truer sized Holes
- Practically burr-free Holes
- Less Bell-mouthing
- Self-centering drills
- More accurate positioning
- Longer drill life
- Cooler cutting drills
- Cutting edges from O.D. to center of drill point.
- Less grabbing when drilling thin metal
- Minimum work distortion when drilling thin metal
- Proper clearance on entire cutting edge of point
- Lower drill thrust
- Fewer guide bushings, jigs, fixtures, etc.

D R & T COMPANY

DETROIT REAMER & TOOL COMPANY

780 W. MAPLE ROAD • P.O. BOX 174 • BIRMINGHAM, MICH.

CIRCLE INFORM-A-GRAM KEY NO. 8

Talk(s) of the Month

WHAT BUSINESS HAS DONE AND CAN DO FOR THE ECONOMY

Pertinent excerpts from talks presented at this summer's Special Economic Mobilization Conference, sponsored by the American Management Association.

. . . by Cloud Wampler
Chairman of the Board
Carrier Corporation

. . . and Charles H. Percy
President
Bell & Howell Company

. . . and Thomas J. Watson, Jr.
President
International Business Machine Corporation

. . . and R. S. Ingersoll
President
Borg-Warner Corporation

. . . and Elisha Gray II
Chairman of the Board
Whirlpool Corporation

RECESSION NOT A DREAD DISEASE

. . . by Cloud Wampler
Chairman of the Board
Carrier Corporation

FOR MORE THAN A YEAR NOW, we have been engaged in extensive cost- and expense-reduction programs, just as many companies have. And, I am sure we have made a lot of progress. Unfortunately, however, this does not show itself to the extent that might be expected, because the gains are so frequently offset by rising costs and expenses over which we have little if any control. . . .

To a considerable extent we have been chasing ourselves around the stump, so to speak. And yet the tightening-up process is good for Carrier and in due course will be good in some small degree for the economy as a whole. Certainly we are getting rid of a lot of accumulated fat. Also, the younger members of our organization are learning the hard way what economy really is, and, perhaps even more important, they are learning the hard way that goods have to be sold instead of just taking orders.

As I use the expression "learning the hard way," please do not get the idea that we believe in teaching people to swim merely by throwing them into the water. As a matter of fact, one of the most important things that Carrier is now doing is the expansion of its training programs, including great emphasis upon management training.

Getting back to our cost — and expense-reduction efforts for a moment, I am sure that the most difficult task confronting Carrier management is — and will be — to decide when and where to spend money as opposed to when and where *not* to spend it. You know, there are two ways to go broke: One is to spend too much, and the other is to spend too little.

* * * *

From time to time, a business readjustment — sometimes small, sometimes large — is inevitable. If for no other reason, it is inevitable

. . . Continued on page 15

BOXES
Box fingers space to take box sides.
TABS
Bending Block does not disturb flat areas.
HOW TO FORM... Sheet Materials
HEMS
Acute angle is flattened in second bend.
RECTANGLES
Open end finger forms any closed shape.

with a

DI-ACRO BRAKE

The Di-Acro Brake is a six-in-one precision metal working machine simply tooled for a variety of jobs. Ten models in 6", 12", 18" and 24" widths handle up to 16 gauge mild sheet steel.

Consult the yellow pages of your phone book for the name of your nearest Di-Acro distributor or write for 16 page "Handy Guide" to Di-Acro Brakes.

di-acro PRECISION METALWORKING MACHINES

pronounced die-ack-ro

O'NEIL-IRWIN MANUFACTURING CO.
315 Eighth Avenue • Lake City, Minnesota

CIRCLE INFORM-A-GRAM KEY NO. 9

Willis Ehrhardt tells how Moore Jig Borers and Jig Grinders built nation-wide service

This is another in a series featuring the views of owners of leading contract tool and die companies

by **WILLIS G. EHRHARDT**
Managing Partner
Ehrhardt Tool & Machine Company
St. Louis, Mo.
Specialist in High-Precision
Gages and Dies

"'*A nation-wide service for the few who want the most in precision dies, tools and gages.*' That's what we claim; that's what we do. And the backbone of the facilities which enable us to provide this service, is our Moore Jig Grinding and Jig Boring equipment.

"We were the first contract tool and die company in our area to install these versatile machine tools years ago, and we've added the new models promptly. In addition to helping us maintain the highest precision standards, their very flexibility of application brings in a caliber of work which is often beyond the scope of toolrooms and of competition.

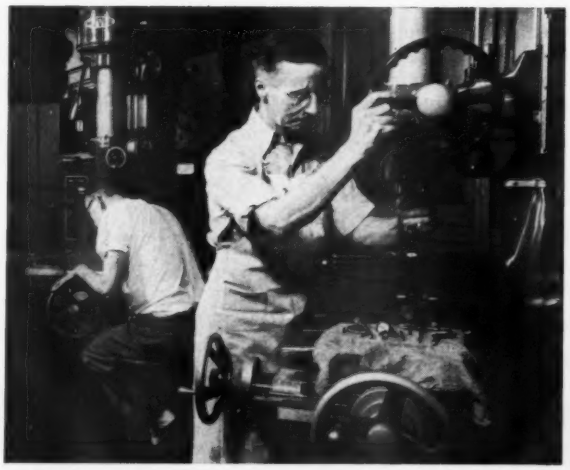
"We are quite proud, for example, of an *all-ground die*, machined entirely on the Moore Jig Grinder, *in hours*. Formerly, we could not have tackled its complex contours and holes. Equally intricate operations have been performed by our Moore Jig Borers.

"Beyond a doubt, the speed, ease of operation and high-precision of our Moore equipment for holes, contours and surfaces are prime factors in keeping us 'first on the Mississippi'."

Can Moore equipment cut costs in *your* toolroom? Moore shows you the way—with literature describing the features of these machines and how they can be used to your profit. For copies, just write...

MOORE SPECIAL TOOL COMPANY, INC.
726 Union Avenue, Bridgeport 7, Connecticut

HOLES, CONTOURS AND SURFACES, Moore's authoritative book, tells how to produce tools, dies and precision parts the modern way. 424 pages, 495 illustrations. $5 in U.S.A., $6 elsewhere.



"MOORE JIG BORERS have proved a profitable investment from their first day of use. They've enabled us to spot, drill, ream and bore, at higher precisions, and faster, than any previous equipment. Carbide die work seems to be their 'cup of tea'."

"OUR MOORE JIG GRINDER has established a record of trouble-free performance absolutely unmatched... especially remarkable in view of the many 'trick' operations it is called upon to handle."

ADD MOORE TOOLS TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTOGRAPH WHEEL DRESSERS • PRECISION ROTARY TABLES • HOLE LOCATION ACCESSORIES

CIRCLE INFORM-A-GRAM KEY NO. 10

WHY USE TWO..

DRILL CHAMFER
DRILL C'BORE
DRILL DRILL
DRILL REAM
A FEW EXAMPLES OF HOW MOHAWK SUBLANDS MORE ECONOMICALLY ACCOMPLISH TWO OR MORE DIAMETERS WITH ONE TOOL IN ONE PASS
Let Mohawk prove to you that a Subland is the most efficient and economical tool to use for multiple drilling operations. Check your maintenance costs along with the number of pieces per grind. Mohawk will guarantee you a savings.

WHEN ONE WILL DO!

Why use two—or more standard twist drills to accomplish a multiple diameter cavity when *one* Mohawk Subland tool will do the job in *one* pass... and, do it more efficiently, accurately and economically!

Why overload yourself with an assorted inventory of ordinary drills when you can save time, money and equipment by combining your requirements in a few versatile, accurate Mohawk Subland tools.

One Mohawk Subland tool will outwork and outlast dozens of ordinary drills. Because Sublands are infinitely accurate and they can be repeatedly reground (in your shop) without losing their concentricity.

Examine your hole costs, then see for yourself how many places a Mohawk Subland could easily and effectively handle the job and reduce your hole costs all along the line.

Normal Delivery on
MOHAWK SUBLANDS
Size Optional — 3 to 7 Days
from receipt of order!

Write... Wire... Phone Today

and let a Mohawk engineer prove just how easy it is to save your time—money and tools through the use of Mohawk Sublands.

YOURS FOR THE ASKING

Request your copy of the new Mohawk brochure entitled "Why Use Two . . . When One Will Do". You'll find it's loaded with interesting ideas plus dozens of suggestions that will save you drilling dollars.

world's largest producers of Sublands

Mohawk TOOLS, Inc.
Montpelier, Ohio

CIRCLE INFORM-A-GRAM KEY NO. 11

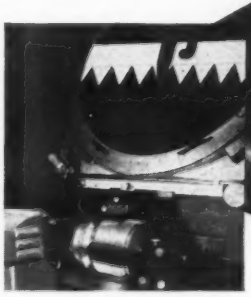
NEW

JONES & LAMSON EXTENDED RANGE OPTICAL COMPARATOR

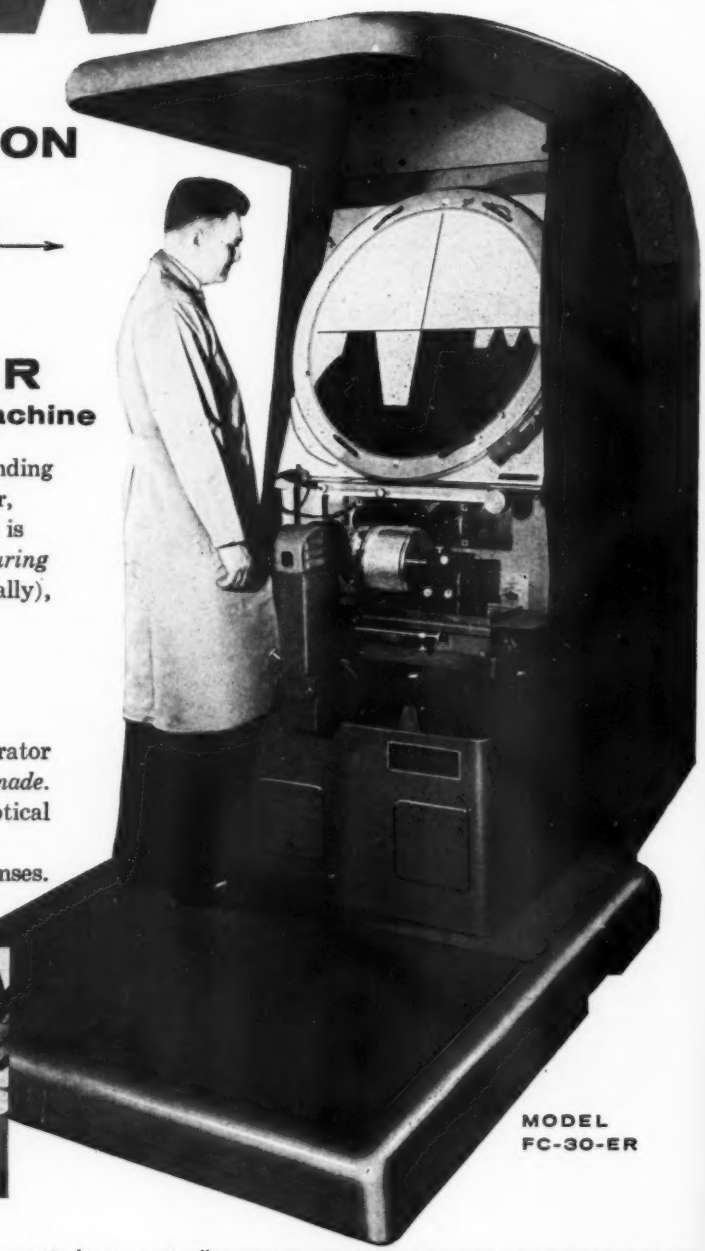
and Universal Measuring Machine

Again, Jones & Lamson fills a long-standing need by introducing a new Comparator, the FC-30-ER, with 30″ dia. screen. It is designed especially to give *added measuring capacity* (up to 10″ horizontally, 8″ vertically), and *added work capacity* (200 lbs. and more, on a rugged 8″ x 32″ table, supported on precision rolls and twin heavy duty columns).

This new Extended Range J & L Comparator is *the largest standard 30″ Comparator made.* It includes J & L's True Telecentric Optical System, Adjustable High Intensity Illumination and Precision Matched Lenses.



The FC-30-ER, equipped with J&L's NEW Lead Amplifier, affords precise inspection of thread lead to .0001″. The Amplifier produces up to a 500:1 amplification of any lead error in threads ranging from 4 to 70 pitch.



MODEL FC-30-ER

"World's oldest and largest builder of precision optical comparators"

JONES & LAMSON

JONES & LAMSON MACHINE COMPANY, Dept. 710, 519 Clinton Street, Springfield, Vt., U. S. A.

Please send me Comparator Catalog GL5803, which describes the complete line of J&L Optical Comparators.

name _____ title _____ street _____

company _____ city _____ zone _____ state _____

CIRCLE INFORM-A-GRAM KEY NO. 12

BETTER CARS ARE BEING BUILT

New

Henry & Wright Double-Crank Dieing Machines Produce More Parts Faster . . . More Accurately

150 ton Henry & Wright, one of ten installed by a leading automobile manufacturer in the Flint area.

Die operations on a hood bumper bracket. After the neck of the part has been freed, the work is advanced by a single tab and a carrier strip.

Stamped parts of today's cars must be produced rapidly and in quantity, but they must also be held to close tolerances of accuracy. Henry & Wright machines are now offered in a new double-crank design. The crosshead is supported on both sides of the die so that the tools close in perfect alignment even with severe off-center loads. Thus, parts are more accurate and uniform . . . die life is greatly extended. Because machine design permits quick and easy die change, non-productive time is reduced to a minimum.

Handling more jobs—faster—and to required accuracy tolerances—makes the H & W machines an integral part of automation processes for any plant. These machines are truly the result of "pooled ideas" from the automotive field and from experienced H & W engineers.

Send today, for complete information on these new and proven production profit makers. Build your new production around Henry & Wrights—they're made by H-P-M, you know, a leader in metalworking processes since 1877.

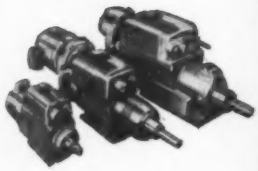
H-804

THE HYDRAULIC PRESS MFG. COMPANY

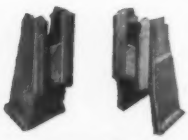
A DIVISION OF KOEHRING COMPANY • MOUNT GILEAD, OHIO, U.S.A.

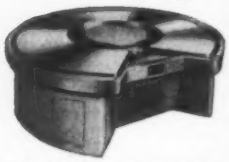
CIRCLE INFORM-A-GRAM KEY NO. 13

THE COST CUTTING METHODS you need AT A PRICE you can afford



Air Hydraulic Drill Units





Circular Machine Base and Columns

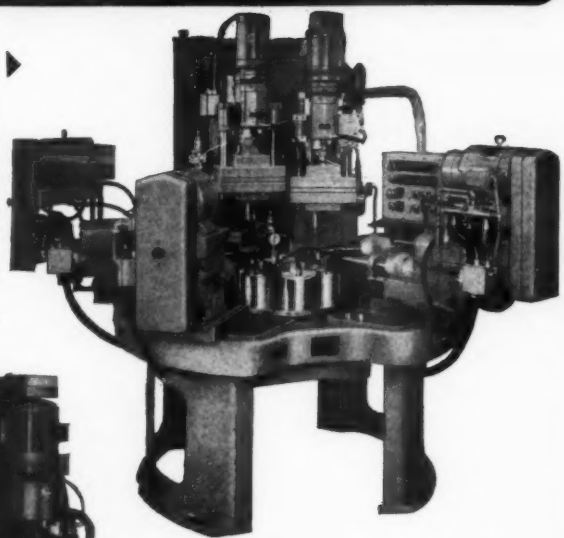
Automatic Lead Screw Tapping Units

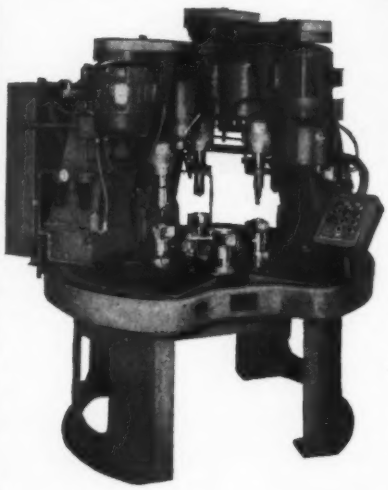
Rectangular Machine Base

EXAMPLE* ▶

A high speed indexing machine to drill and lead screw tap horizontal opposed pipe ports and two vertical mounting holes in stainless steel valve bodies at 320 parts per hour. Standard automatic self-centering Skinner air chucks hold parts.

Photo courtesy of The Skinner Chuck Company

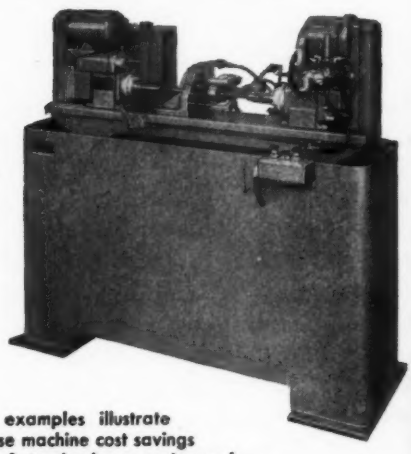




◀ **EXAMPLE***

Combination drill, bore and face plus two tapping operations in die cast regulator valve spring cages. Capacity: 450 parts per hour.

Photo courtesy of Watts Regulator Company



EXAMPLE* ▶

Double end opposed combination ream and face die cast piston plates to close tolerance. Simplified air-manual fixture loading permits production of 423 parts per hour.

Photo courtesy of Bendix Products Division Bendix Aviation Corporation

***Note**

The above examples illustrate single-purpose machine cost savings through use of standard pre-engineered components. The components, bases, columns, adapters and units as shown, are available for machines built by you or for you from Hartford Special.

Write today for full information and name of our nearest field man—a specialist in low cost production techniques.

HARTFORD Special

THE HARTFORD SPECIAL MACHINERY CO.
MACHINE TOOL DIVISION
2928 HOMESTEAD AVENUE, HARTFORD 12, CONN.

CIRCLE INFORM-A-GRAM KEY NO. 14

. . . Month's Talk from page 9

because of excesses indulged in, for which we eventually have to pay.

Using Carrier's own recession to make my point, I now know that in 1956 we overloaded certain of our distributors and dealers. Here I mean to sound a note of warning about "hard selling." Although I believe in hard selling, I do not believe in overselling, and almost always it takes a lot of wisdom to distinguish between the two. In this connection, I should like to ask: Did the sale of more than seven million motor cars in 1955 help or hurt the American economy?

Let us not lose sight of the fact that numerous segments of American industry supplied in 12 years — or maybe even less — the civilian demand of 18 years. And it was this that caused so many of us to believe that the trees would actually grow to the skies. Therefore, a great deal of new productive capacity was provided, and the total was more than was actually needed to supply normal demand. The result was inevitable, and in the eighteenth year of the period I am now discussing — that is, 1957 — the good old-fashioned law of supply and demand began to catch up with us. So here we are with a case of indigestion that is pretty painful.

I am not sure what you do when you have indigestion, but I know what I do. I just give the old stomach a bit of rest and simultaneously try to build up my over-all health. This, I suspect, is an apt though homely illustration of what is happening and *should* happen currently in many segments of the American economy. But for the love of heaven, let's not get indigestion confused with dread disease!

* * * *

PRODUCE BETTER VALUES FAST

. . . by Charles H. Percy
President
Bell & Howell Company

LAST YEAR, WHEN THE DIP in general business activity became apparent, we were faced with a basic decision which can be stated simply, although it took a good deal of determination to see it through. Our long-range planning of new and improved products is done on a 60-month basis; subject, of course, to continuous review. We had three possible choices.

First, we could *stick* to our carefully-laid plans, for new product development, plans made in a period of expanding markets.

Second, we could *slow-up* our timetable in order to "wait and see what happens." If we did that, we would of course, slow-up our growth and perhaps our increase in market-position.

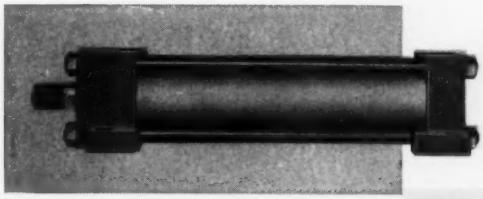
But there was still another choice. We could gear ourselves for a maximum effort. We could speed-up the development and manufacture of these new products; bring them into the market much earlier than originally planned; step-up our selling impact on the consumer and trade; reduce selling prices where we could — *and so, get the full benefit of these new and better consumer values, when we need them most to maintain our sales and profits.*

We decided on the third course of action: to *move* . . . and move *fast*. We decided not to drift downward with the general business recession if we could help it.

A Plan of Attack

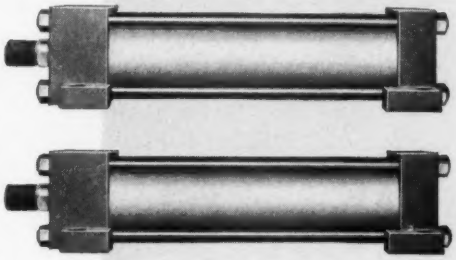
We therefore undertook a two-fold program . . .

. . . *Continued on page 24*



A LOGAN SUPER-MATIC CYLINDER
2 competitors' cylinders

do they LOOK ALIKE?
...sure they do on the surface...



...BUT LOOK AT Logan's BIG EXTRA PLUS VALUES

Logan Super-Matic Cylinders
are made to interchange with other leading manufacturers' cylinders . . .

1 Logan designs assure the service required for those extra-rugged applications.
2 Over FORTY YEARS of cylinder manufacturing know-how.
3 Built by CRAFTSMEN whose average service record with LOGAN is more than 20 years.
4 Manufactured in a plant which applies the most modern production methods.

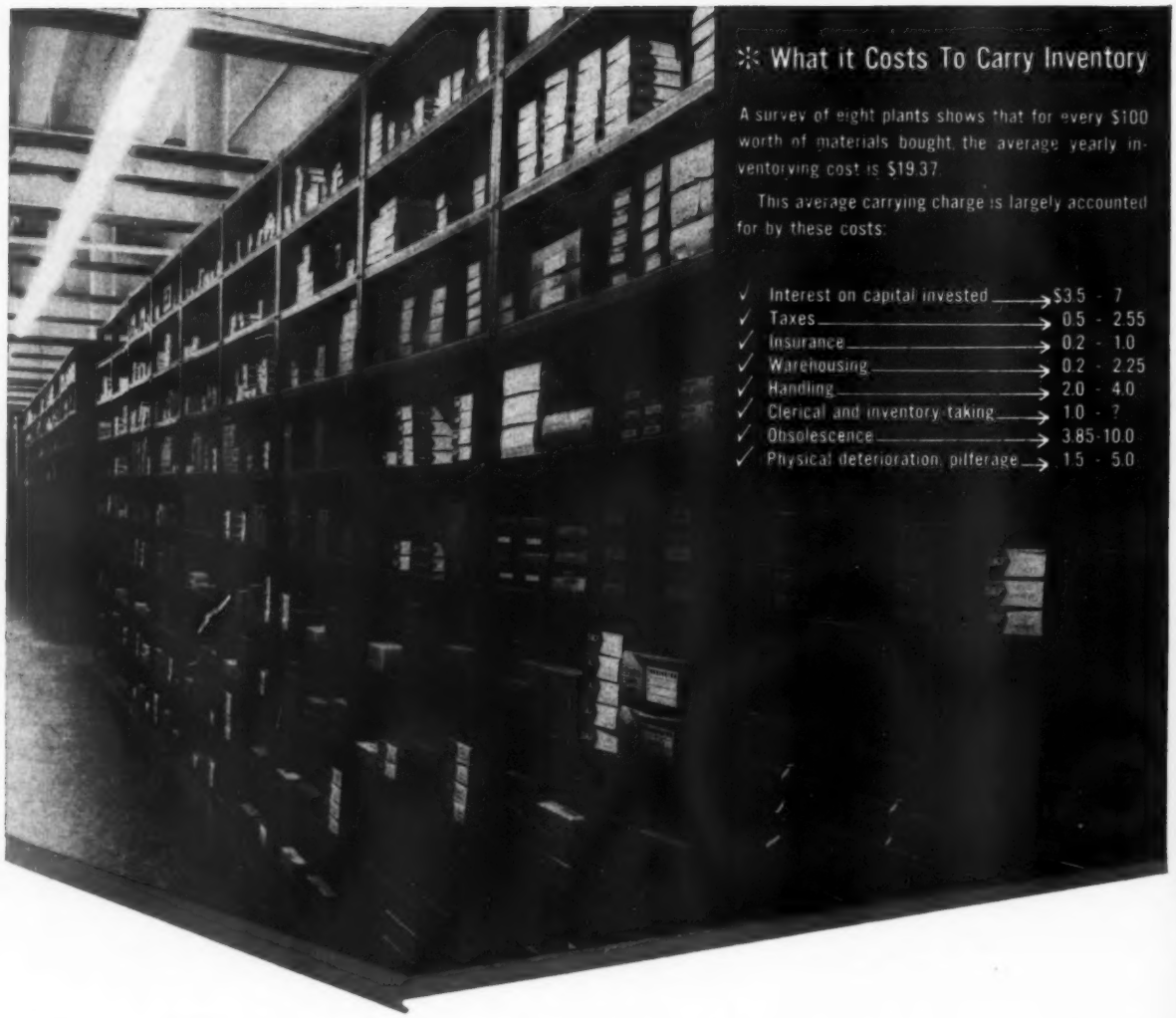
FREE
SEND FOR THE "LOGAN CALCULATOR"

LOGANSPORT MACHINE CO., INC.
844 CENTER AVENUE, LOGANSPORT, INDIANA

PLEASE SEND COPY OF CATALOG:
☐ 100-1 AIR CYLINDERS
☐ 100-2 MILL-TYPE AIR CYLS.
☐ 100-3 AIR-DRAULIC CYLS.
☐ 100-4 AIR VALVES
☐ 100-5 LOGANSQUARE CYLINDERS
☐ 100-6 ULTRAMATION CYLINDERS
☐ 300-2 PRESSES
☐ FACTS OF LIFE
☐ 200-1 HYD. POWER UNITS
☐ 200-2 ROTOCAST HYD. CYLINDERS
☐ 200-3 750 SERIES HYD. CYLINDERS
☐ 200-4 AND 200-7 HYD. VALVES
☐ 200-6 SUPER-MATIC CYLS.
☐ 300-1 CHUCKS
☐ ABC BOOKLET
☐ CIRCUIT RIDER

TO:
NAME _____ TITLE _____
COMPANY _____
ADDRESS _____

CIRCLE INFORM-A-GRAM KEY NO. 15


What it Costs To Carry Inventory
A survey of eight plants shows that for every $100 worth of materials bought, the average yearly inventorying cost is $19.37.
This average carrying charge is largely accounted for by these costs:
✓ Interest on capital invested → $3.5 - 7
✓ Taxes → 0.5 - 2.55
✓ Insurance → 0.2 - 1.0
✓ Warehousing → 0.2 - 2.25
✓ Handling → 2.0 - 4.0
✓ Clerical and inventory-taking → 1.0 - ?
✓ Obsolescence → 3.85-10.0
✓ Physical deterioration, pilferage → 1.5 - 5.0

Bearings, Inc. can cut your costs on bearing inventory . . . 2 ways!

Inventory costs soak up a lot of dollars that could do much more for your company in other ways. We now perform inventory cost-cutting services for many of our customers and are ready to do the same for you.

First, a bearing survey of the bearings used in the equipment in your plant. We convert manufacturers' parts numbers to bearing numbers. This survey usually shows many identical bearings being held in inventory for different equipment when only one or two bearings will satisfy your immediate needs. A complete record is made of all bearings you actually require and we keep this record up-to-date.

Second, you keep in inventory only a minimum number of bearings to take care of emergencies. Bearings, Inc. guarantees that the branch nearest your plant will stock all the bearings shown on your survey, ready for immediate delivery day or night!

Call or write for a Bearings, Inc. sales engineer to discuss this important, money-saving program NOW! Check our branch locations for the one nearest you.

**Reprinted from THE IRON AGE, September 12, 1957.*

Providing bearing service in the North → **BEARINGS, INC.**

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Lockland • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute • **PENNSYLVANIA:** Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Parkersburg • Wheeling • **NEW JERSEY:** Camden
NEW YORK: Buffalo, Balanrol Corp. • **MARYLAND:** Baltimore • **DELAWARE:** Wilmington

and

in the South → **DIXIE BEARINGS, INC.**

FLORIDA: Jacksonville • **GEORGIA:** Atlanta • **KENTUCKY:** Louisville • **LOUISIANA:** Baton Rouge • New Orleans
N. CAROLINA: Charlotte • Greensboro • **S. CAROLINA:** Greenville • **TENNESSEE:** Chattanooga • Kingsport • Knoxville • Nashville

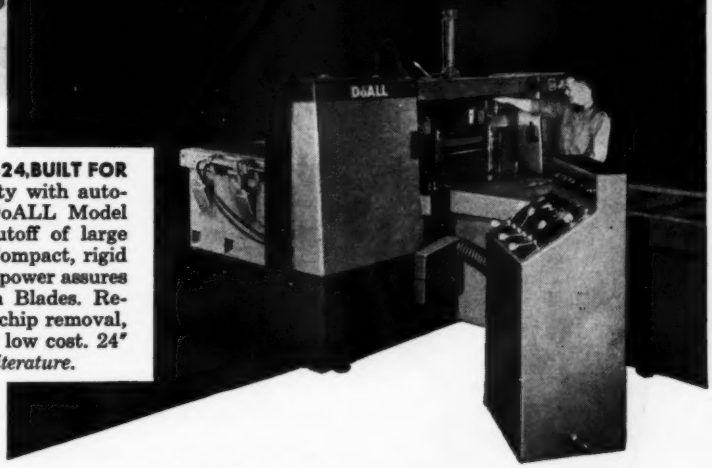
CIRCLE INFORM-A-GRAM KEY NO. 16

Before you buy any cutoff saw— see these NEW DoALL BAND MACHINES

NEW MODEL C-12, ACCURACY AT LOW COST Ideal for small shops or for intermittent production. Ample power and rigidity assure maximum performance from Demon High Speed Steel Blades. This model cuts mild steel at 10 sq. in. per minute. Unsurpassed for accurate machining of tough, expensive steels, pipe, structurals, etc. Four speeds. 12" x 12" capacity, manual control. *Write for new literature.*

NEW MODEL C-58, HIGH PRODUCTION, COMPLETELY AUTOMATIC World's fastest automatic cutoff sawing—easily adapted with standard attachments to meet any specific production requirement. Designed expressly for Demon High Speed Steel Blades. Infinitely variable speeds. 12" x 12" capacity. Also available in Model C-57, with manual control. *Write for new literature.*

NEW AUTOMATIC MODEL C-24, BUILT FOR YOUR BIG JOBS Giant capacity with automatic operation makes the DoALL Model C-24 excellent for low-cost cutoff of large billets, pipe and structurals. Compact, rigid design combined with extreme power assures full performance from Demon Blades. Reversible conveyors, automatic chip removal, automatic control available at low cost. 24" x 24" capacity. *Write for new literature.*



Ask About Our Lease Plan!

DoALL originated the leasing of machine tools. Its successful operation for many years can mean immediate savings to you. All DoALL machine tools can be leased at low rental with purchase option.

This is a typical DoALL Store

You name the cutoff job *and DoALL will show you how to cut it faster, cheaper and more accurately than any other machine can do today!*

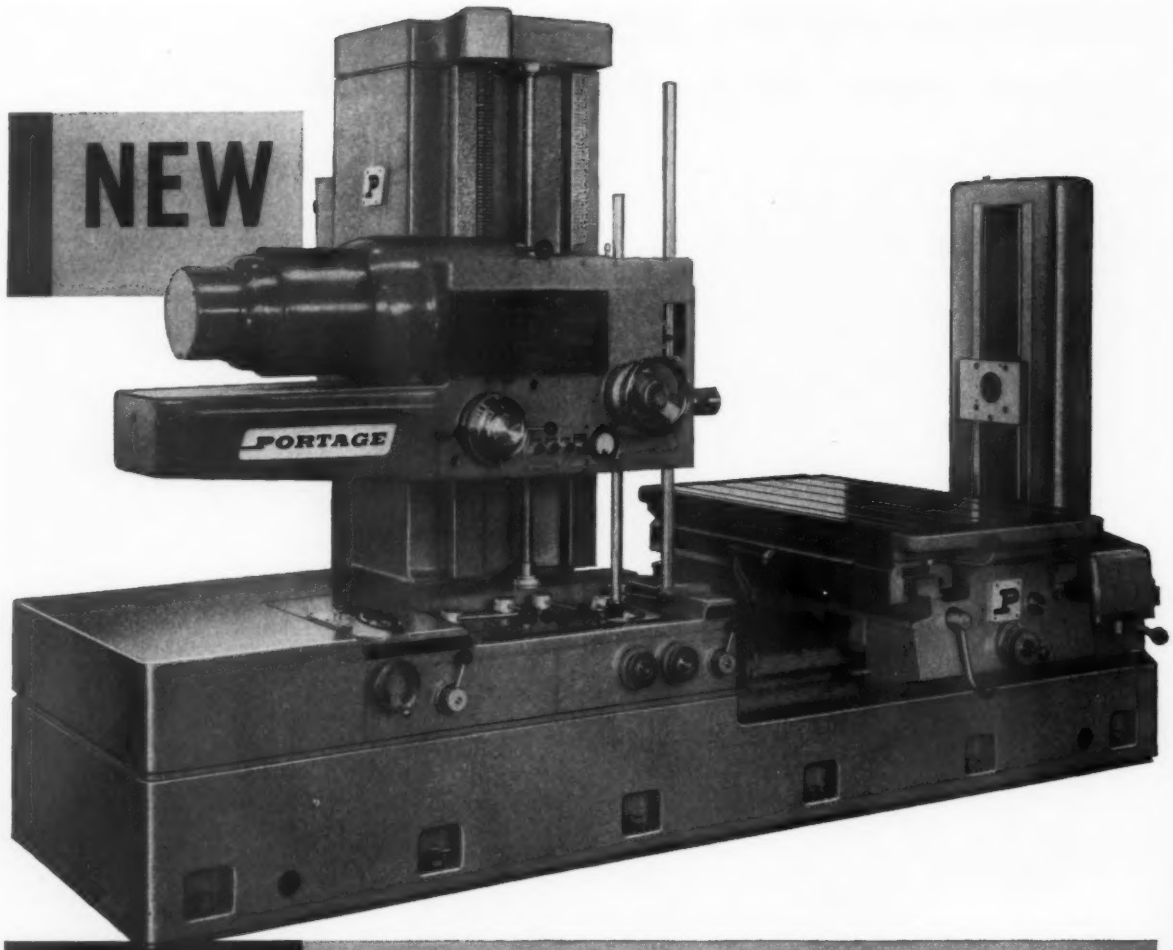
Better still, DoALL will provide the exact type and size band machine you need to fit your budget—whether it's for smallest toolroom jobs or high-production runs.

DoALL *integrated design* is the secret—powerful, rigid band machines designed to get the full performance from world-famous DoALL Demon High Speed Steel® Blades. This engineered combination gives you up to six times the cutting speeds of other band saws . . . up to twice the speeds of power hack saws of comparable capacity. Find out *how* you can save time and labor, reduce cutting-tool costs, minimize material waste and hold down your capital investment. Call your DoALL Store today, or write The DoALL Company, Des Plaines, Illinois.

PS-12

THE DoALL COMPANY, Des Plaines, Ill.

CIRCLE INFORM-A-GRAM KEY NO. 17



PORTAGE...3" diameter horizontal milling, drilling and boring machine

Literature, just off the press, covers features and specifications.

Mr. Buyer... here's a 3 inch bar machine you can't afford not to investigate. It's new from the top of the column to the bottom of the base... All new speeds and feeds, plus a versatility of job applications make it a real money maker. All new construction features offer a truly strong, rugged machine... and the pay-off... it's priced amazingly low, every shop can afford one ...write, wire or phone for complete information.

THE PORTAGE MACHINE COMPANY

10 SWEITZER AVE., AKRON 11, OHIO
PORTAGE 2-0211 TWX AK266

BUILDERS OF PRECISION MACHINE TOOLS, SPECIAL AND PRODUCTION MACHINERY SINCE 1916

CIRCLE INFORM-A-GRAM KEY NO. 18

The Candy with the Hole in the Middle

*The Drill Bushing with the Hole in the Middle **

* Our 100% concentricity inspection means every hole is EXACTLY centered. Another "Life Saver" for you!

American
DRILL BUSHING CO.
5107 Pacific Boulevard
Los Angeles 58, Calif.

SEND NOW FOR FREE COPIES OF OUR NEW CATALOGS

CIRCLE INFORM-A-GRAM KEY NO. 19

Acme-Fette rolls threads to tight "specs"

...WITHOUT MAJOR INVESTMENT

The tool engineers of Air-Hydraulic, Inc. were faced with rigid specifications and the necessity of an extremely fine fit and finish for this high temperature hydraulic actuator for aircraft use. Conventional thread cutting methods would have been costly.

After careful study they found that Acme-Fette thread rolling heads would meet all requirements when applied to their *existing turning equipment.* Major machine investment was eliminated and a low rejection rate meant additional economies because threading was the last of a number of costly operations.

The Results

- 1"-20, ¾"-16, and 5/16"-24 threads were rolled 5 times faster than possible with conventional thread cutting dies —thread rolling speeds are equal to turning speeds with high speed tool steels.
- Cold-forming action of the Acme-Fette produced a tougher thread and one 60% smoother than grinding or chasing (a 5 micro-inch finish).
- Rejection rate: less than ½ of 1%.

The Material

- Steel: 4340—upset forging
- Tensile strength: over 160,000 p.s.i.
- Hardness: 36-40 on Rockwell C scale

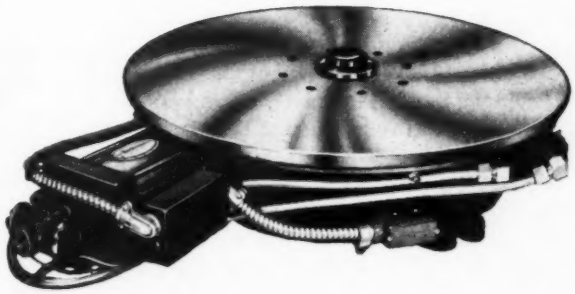
For cost-reducing ideas showing how you can put Acme-Fette self-opening thread rolling heads to work on your present equipment, send for Bulletin NAF-57A.

National Acme

THE NATIONAL ACME COMPANY
169 East 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N. J., Chicago 6, Ill., Detroit 27, Mich.

This "do it yourself" Automation Kit can cut hole drilling costs ...in half!



WHY HESITATE?

No cost to investigate —

Let us send you a set of engineering bulletins showing how you can use these versatile units; plus typical case history stories showing how others are cutting drill press costs.

Write Dept. TP-858, The Bellows Co., Akron 9, Ohio. (In Canada, Bellows Pneumatic Devices of Canada, Ltd., Toronto 18, Ont.) Ask for Bulletin DP-110 RT.

The kit consists of two units: a Bellows Drill Press Feed which attaches to the star wheel shaft of a drill press and feeds the spindle automatically; and a Bellows Rotary Feed Table which positions parts under the spindle and removes them automatically.

These two "automation" production units can turn almost any standard drill press into a high speed automatic machine. All the operator has to do is load and unload the feed table. Easily adjustable controls permit precise regulation of feed rate to fit the needs of any tool working in any material.

Your own tool room people can make the installation quickly. The total cost rarely runs more than the wage cost of a single operator for a few weeks. And the chances are good your savings will offset the price even before our bill is due.

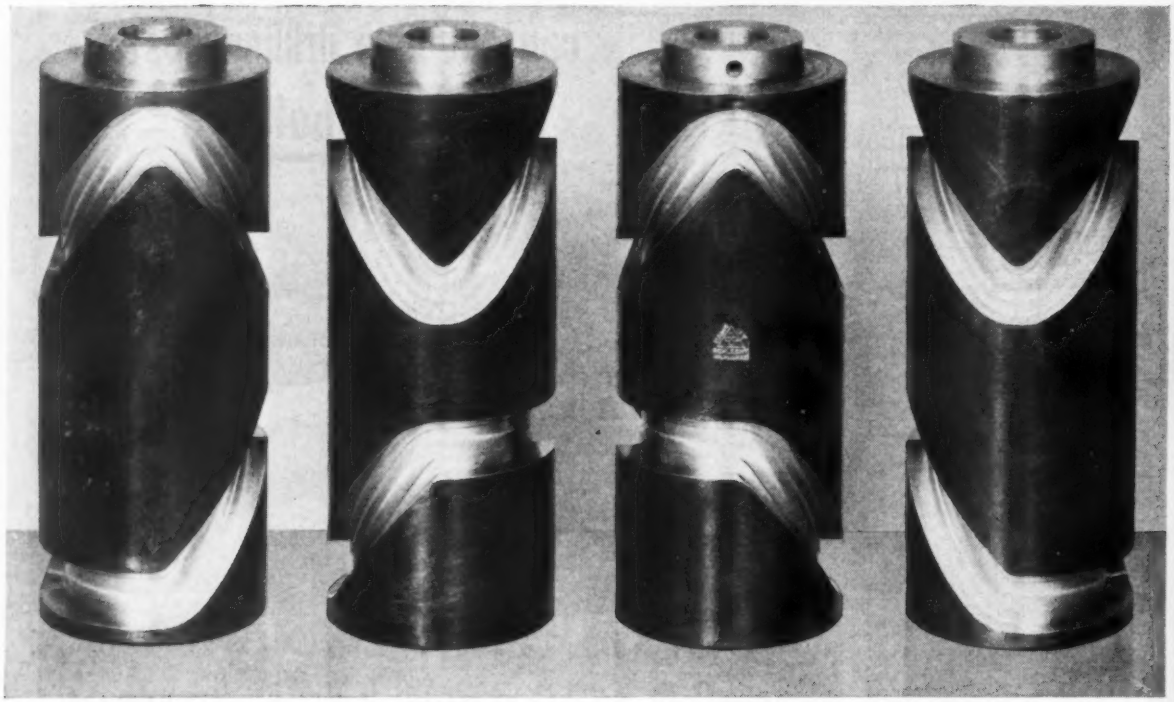
1124-B

The Bellows Co.

AKRON 9, OHIO

"We produce better cams at lower cost with GRAPH-MO® steel"

...says L. G. Schlecht & Son, Inc.



TO make cams of all types—some small, some large—and produce them better at lower cost—L. G. Schlecht & Son, Inc., chooses Graph-Mo® steel. Developed by the Timken Company, it's a special oil hardening tool steel that machines faster and easier than ordinary steels. Result: machining time and production costs are cut.

Graph-Mo wears longer, because of the combination of free graphite and diamond-hard carbides in its structure. Users report it outwears other tool steels 3 to 1! What's more, Graph-Mo responds uniformly to heat treatment, minimizing distortion—saving time and money on the trickiest, toughest jobs. And it has minimum tendency to pick up, scuff or gall.

Graph-Mo is one of four graphitic tool steels developed by the Timken Company. They have many uses in producing machine parts, dies, punches and gages . . . giving a better product at lower cost. For more information, send for the Timken Company's Graphitic Steel Book, or call or write our engineers. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".

Timken graphitic steels are carried in stock by 9 distributors with 42 warehouses in 31 cities in the United States and Canada.

TIMKEN *Fine Alloy* **STEEL**

TRADE-MARK REG. U.S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

CIRCLE INFORM-A-GRAM KEY NO. 22

For mass production grinding at lowest unit cost... Blanchard Center Column Surface Grinders

W-1156

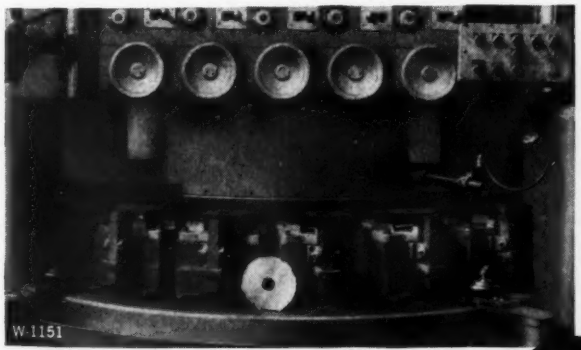
For long-run work at high production rates, it's just plain good economic sense to grind flat surfaces on the Blanchard. These automatic multiple-spindle machines are widely used in the cost-conscious automotive industry for close-tolerance grinding from the rough castings or forgings. Time-saving Blanchard fixtures allow a single operator to handle large quantities of parts every shift.

Blanchard Center Column Grinders are available with three, four or five grinding spindles and 80", 90" or 100" O. D. work tables to handle a wide variety of parts. The No. 100-A5 is shown.

New functional design, with minimum floor space, provides several advantageous features. Sludge disposal is automatic to coolant reservoir . . . power rapid traverse on each head speeds wheel changes. Wheels are easily reached through separate doors from the floor. Centralized lubrication . . . all operating controls are easily accessible, with complete safety features for operator and machine protection . . . large loading-unloading area. These and other features result in better grinding jobs in less time—*and at less cost*—when you Put It On The Blanchard.

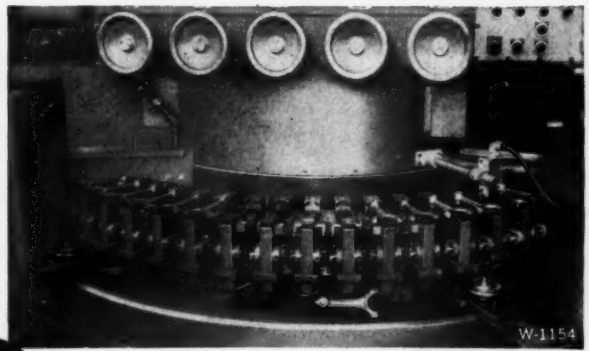
Send for illustrated folder No. 374 which describes the 3 models of the Center Column machines in detail.

Typical Grinding Jobs Performed on the Blanchard Center Column Grinder:



W-1151

Front Pump Cover. MATERIAL: Cast Iron. STOCK PER SIDE: 1/16" to 3/32". NO. OF SIDES GROUND: One. LIMITS: Must be flat within .002". PRODUCTION: 360 pieces per hour (net). These pieces are ground in a 20 station fixture, on a No. 100-A5 Blanchard.



W-1154

Connecting Rods. MATERIAL: Steel forging. STOCK PER SIDE: 1/32". 1st OPERATION: Grind 2 sides and 2 ends. LIMITS: ±.001". NO. OF SIDES: 2. PRODUCTION: 600 per hour, 1200 surfaces (net). These pieces are ground in a 60 station fixture, on a No. 100-A5 Blanchard.

THE BLANCHARD MACHINE COMPANY 64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

CIRCLE INFORM-A-GRAM KEY NO. 23

. . . Month's Talk from page 15

1. We decided to *maintain* and in some instances *increase* those expenditures which create new sales and build for the future.
2. We undertook to further *reduce* and *eliminate* costs which add very little to the value of our products or future progress.

As for specific, positive actions:

We had a number of new Bell & Howell products in research and engineering at various stages of design. Many were not scheduled for production until the end of 1958 or early 1959. With the enthusiastic cooperation of our engineering group, this calendar of schedules was moved ahead so that all nine new products (one of these a complete product line) could be introduced in March, *this* year, instead of next year.

* * * *

In March of this year, we brought out four new models of the 8mm electric eye camera, ranging in price from $99.95 to $159.95.

* * * *

At these lower prices, we knew we would have to sell one-third *more* cameras to reduce our manufacturing costs to the point where we could show a satisfactory profit — on a line that had been a major factor in 1957 sales and earnings.

These lower prices also meant we would have to commit ourselves to manufacturing the additional cameras well ahead of time; to be ready for the increase in 1958 sales we hoped would result from stepped-up advertising, publicity and the new low prices.

As this decision to set-up our volume called for an expansion of our manufacturing facilities, in order to be able to produce the additional cameras, as well as the eight other new products re-scheduled for March of this year.

Again we had to move — and move rapidly. We leased 120,000 additional square feet of space in a nearby plant — incidentally, on a more favorable long-term lease than could have been secured a year before. Moving our warehouse, shipping and other departments to this new space, gave us an equivalent area of added manufacturing space in our main plant.

But we didn't stop there. New machines to automate all possible manufacturing operations also come within the category of creative spending. With these, our spending for capital equipment will represent a 67% increase in 1958 over 1957.

Then, we faced the problem of selling our additional product to dealers and the public. We increased our spending here, too; tripling our advertising and promotion expenditures in the second quarter of 1958.

Again, we found it a very good time to be buying in the open market, for we purchased valuable network television time on four major shows at less than its original cost.

* * * *

LET SALESMAN BE WITH PROSPECTS

. . . by Thomas J. Watson, Jr.

President
International Business Machines Corporation

IN SALES WE ARE CONCENTRATING on improving the efficiency of our representatives — emphasizing more prospecting — trying to eliminate paper work. A salesman is only effective when he's in front of a prospect, and in our company this is only about 180 min per day. Anything we do here to improve his

. . . *Continued on page 28*

Ehrhardt's part in "the new precision" can benefit you

Jig grinding a progressive die section on a Moore Jig Grinder. All such work is done in a fully air-conditioned atmospheric controlled jig borer room.

* *Write today for*

triple plus

the complete picture story of what Ehrhardt's combination of tool making skills and full range facilities can mean to you—in profits. Write for your copy.

LIFE Magazine saluted the Ehrhardt/St. Louis benchmark in its series of articles, *America's Arts and Skills.*

Since we produced the first precision check gages, dies, jigs and fixtures on the Mississippi 30 years ago, exceptional precision and its measurement have been our aim—indeed, our obsession.

We maintain our tooling facilities at a constant peak. Our equipment includes the latest Moore machine tools for accurate holes, contours and surfaces. Our Elox electrical discharge machining helps satisfy your needs for ultraprecision with another up-to-the-minute facility. EDM can effect substantial savings over other methods.

As other tooling improvements develop you can depend on Ehrhardt to provide them—and to hold to a minimum the multiplying costs which go with attaining vanishingly small tolerances.

Are *you* one of "the few who want the most" in advanced tooling? If so, call on Ehrhardt. Join the elite among manufacturers for electronics, aviation and automotive industries who use Ehrhardt's triple plus tooling service.*

Ehrhardt/St. Louis

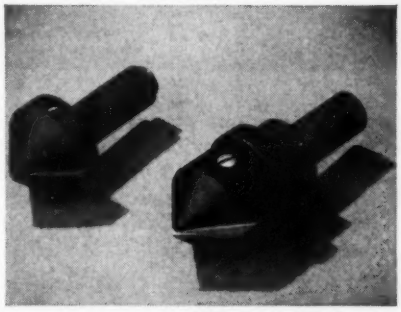
Ehrhardt Tool & Machine Company, 914 Monroe St., St. Louis 6, Mo.

A nationwide service to the few who want the most in precision gages, dies, jigs and fixtures

CIRCLE INFORM-A-GRAM KEY NO. 24

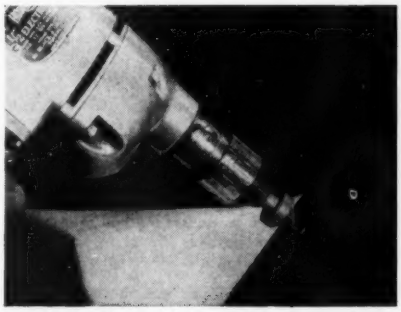
INGENIOUS NEW... UNIVERSAL R&R DEBURRING TOOL

with spring loaded retractable blade eliminates chatter gives precision-cut edge or chamfer at high speed



The cutting action of Model 955 Universal R&R chatterless Deburring Tool (on the left) is effected by spring tension against the blade. On Model 956, right, the spring tension is against the body. This is adjustable to regulate the depth of cut. The blade is free-floating to allow self-alignment and uniform stock removal.

The new Universal R&R Tool makes a handy horizontal deburrer when used with a portable drill held in a vise. With proper adjustment, the R&R Deburring Tool is CHATTERLESS. A new design allows the bearing angle of the tool body and the blade to be in continuous contact with the work piece at all times.



R&R Deburring Tool used in electric drill as a portable unit for heavy plate or other objects too heavy to handle. Blades of the R&R Deburring Tool are replaceable at nominal cost from stock. They are made of high speed steel, precision hardened and ground to close tolerances for interchangeability.

Used in any standard drill press at the high operating speeds recommended by the makers of high speed steels, the R&R Deburring Tool performs most efficiently. High operating speeds mean more production, lower costs. Each tool is made in a full range of sizes to 1½" diameter.

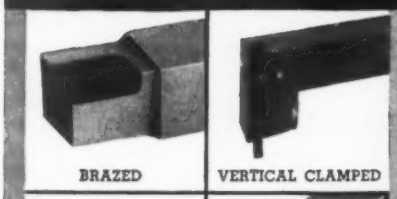
UNIVERSAL ENGINEERING COMPANY

209

FRANKENMUTH 8, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 25

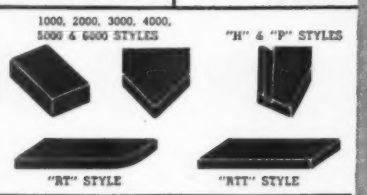
Caterpillar REG. U.S. PAT. OFF. Tractor Co. gets results . . . with Talide S-92


BRAZED

VERTICAL CLAMPED

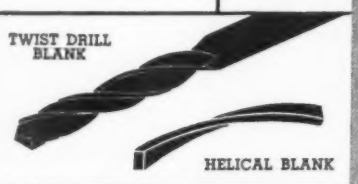
"THROW-AWAY"

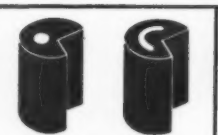
HORIZONTAL CLAMPED



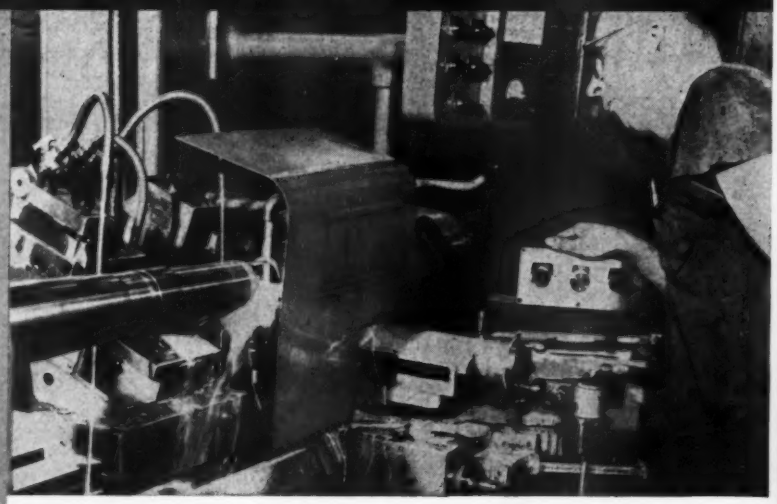
THROW-AWAY INSERTS FOR KLAMP-LOK HOLDERS

"MB" BLANK

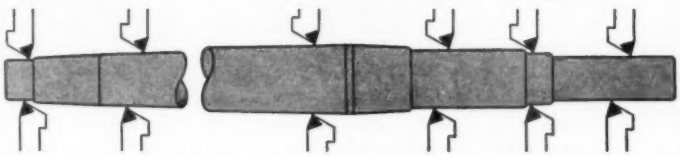



GUN DRILL BLANKS

"TD" BLANK



Caterpillar REG. U.S. PAT. OFF. Tractor Co., leading producer of tractors, diesel engines, motor graders and earthmoving equipment, has been using cost-cutting TALIDE tools for over 10 years to produce parts. Typical example of savings obtained is illustrated below:



CRAWLER TRACTOR AXLE SHAFT

Part . . . . . Crawler Tractor Axle Shaft

Material . . . . . SAE 8645 Steel Forging 3¼" dia. x 38½" long, 3.6mm Brinell Hardness.

Operation . . . . Rough turn all diameters, form tapers, shoulders, and steps.

Machine . . . . . Monarch Mona-Matic No. 21 Tracer Lather, size 54".

Tools . . . . . 12 Talide TB-164 ½" I.C. Triangular TALIDE Throw-Away Inserts mounted in Klamp-Lok Toolholders, Grade S-92.

Depth of Cut . . ⅜"

Feed . . . . . 6" per min.—.018 F.P.R.

Speed . . . . . S.F.M. 387—R.P.M. 340

Coolant . . . . . Soluble Oil and Water

Results . . . . . TALIDE Grade S-92 turned 7 shafts per corner per grind for total of 42 shafts per grind. Inserts were ground an average of 6 times and produced a total of 294 shafts over life of insert. Next best premium carbide grade produced 235 shafts.

Call in a Talide sales engineer to recommend proper tooling for your machining operations, or write for 76-page catalog No. 57-G. METAL CARBIDES CORPORATION, 6001 Southern Blvd., Youngstown 12, Ohio.

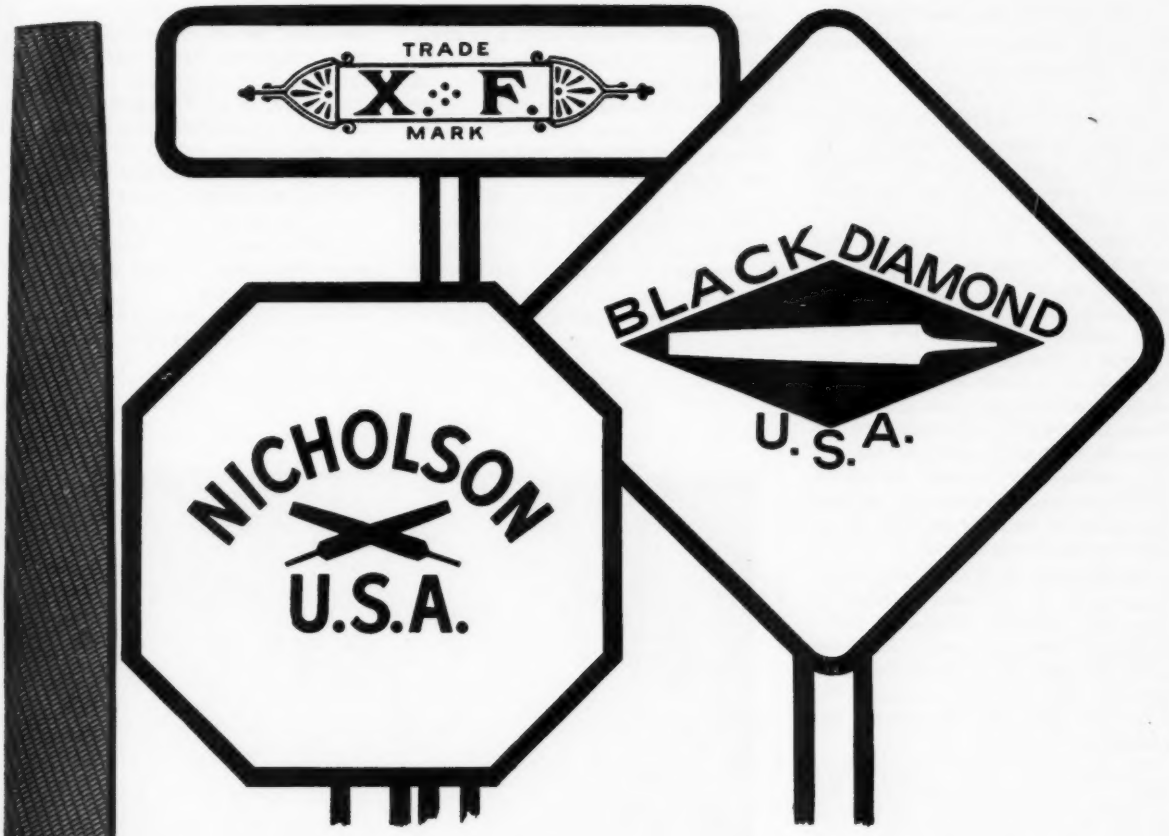
CONSTANT RESEARCH PAYS OFF!

Year after year Talide metal improves in hardness, strength, rupture resistance and crater resistance properties. Processed in latest type vacuum electric furnaces under rigid laboratory control—all Talide grades are uniform and consistent in quality.

METAL CARBIDES CORPORATION
MC TALIDE®
YOUNGSTOWN 12, OHIO

HOT PRESSED AND SINTERED CARBIDES • VACUUM METALS
HEAVY METAL • ALUMINUM OXIDE • HI-TEMP. ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

CIRCLE INFORM-A-GRAM KEY NO. 26



THREE GUIDES TO GOOD FILING RESULTS

Each of these trademarks on a file is a *guarantee* of satisfaction.

None of them ever appears on a file until our quality control inspectors are satisfied that the file deserves it. It doesn't take much for one of these cold-eyed policemen to turn a file down.

As they guard the reputation of Nicholson, Black Diamond and X.F. Swiss Pattern files, they also protect you. They make sure that these trademarks will live up to their reputation on whatever job you give them to do.

Because we take extra care to make every file just a little bit better, they do a little more for you. And just a small performance improvement cuts filing time in your shop substantially. And that's where a file proves its real worth . . . and the reason why files with these trademarks are at work in more shops than any other.

You can trust these symbols to guide you to the best filing results. They've been doing just that for file users and buyers for over 90 years.

✳ **Industrial Distributors provide the finest goods and services in the least possible time. Our products are sold exclusively through them.**

"Magicut" All-Purpose Machinist's file. One of 6000 quality files bearing the Nicholson File Company trademark.

NICHOLSON FILE COMPANY, PROVIDENCE 1, RHODE ISLAND
(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

NICHOLSON and BLACK DIAMOND FILES

A FILE FOR EVERY PURPOSE

CIRCLE INFORM-A-GRAM KEY NO. 27

. . . Month's Talk from page 24

time with prospects is more money in his pockets and ours.

* * * *

. . . we have recently been examining our own salesmen's activity. In the happy easy selling days of the past ten years we have increased our individual quotas 600% over the late thirties. This increased quota has forced our salesmen to bypass the small prospect and concentrate on wholesale selling. This is a significant change in our pattern and if allowed to continue could reduce our business to a basis where we were adding almost no new customers. From 1937 to 1957 our business grew from 30 million to one billion, and our customers from 2000 to 20,000. Obviously, our growth must be continued on a basis of gaining many new customers each year.

We conclude that sales and marketing plans in our own business at least, can get quite warped in times of boom. If these same plans are used in times of lessened industrial activity, they can well change the entire course of the growth of our business.

A new sales and compensation plan is being put into effect in our largest division to better meet present day markets. This plan will compensate salesmen more equitably for the effort necessary to pioneer new accounts. We know that from a long term growth view, a dollar of new rental is more valuable to us than a dollar of additional rental in an existing customer's account, and our new commission rates will reflect this.

Generally, we're going back to emphasizing the fundamentals in selling that haven't changed in 50 years. Every salesman is going to report on a weekly basis not only calls, but also demonstrations and proposals, as well as the business closed and the percent of quota which has been achieved. The field managers are going to keep weekly records on hours spent in the office, hours spent in the field, and, most important, the number of calls made with the younger salesmen.

Our Electric Typewriter Division has started a new program whereby their service people are encouraged to turn in leads on typewriters that they feel should be replaced. In the last five months, this simple device has provided 13,000 leads and resulted in 1,450 sales.

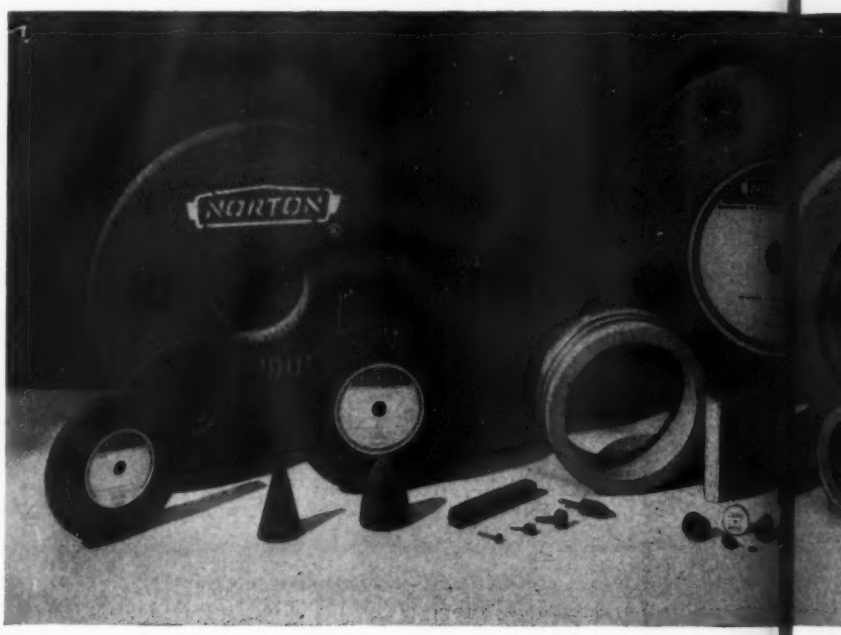
* * * *

On the production side — the present situation has caused us to make some interesting discoveries. To some extent we have been preparing for 1958 for a long time. We have been very fortunate in IBM in having no lay-offs since 1921, and we're doing our best to avoid lay-offs in future. To this end, we have had our purchasing people subcontract about 33% of our sub-assembly.

Theoretically, this would imply that we could take a 33% reduction in volume without lay-offs, but lately we have realized that we have broader responsibilities than just to our own people. A cancelled subcontract means that the subcontractor must lay off his people or find new work for them, and in these times finding new work isn't easy. Therefore, we are trying our best not to cancel subcontracts and when we do, we try to give very adequate notice to the subcontractor.

When we do this, something has to give, and with us it's our backlog. It's still comfortable, but it's down a bit over what it was eight months ago.

We have not cancelled or slowed down any of our capital investment



Are there any bargains

There certainly are. But you can't evaluate a grinding wheel by its price. The only genuine bargains are wheels that help you reduce production costs — by bringing steady economy to your grinding jobs.

So, whenever cut-price bait seems tempting, consider the advantages of using Norton grinding wheels.

To begin with, you get fair prices. In addition, you get top quality and top performance. The most advanced research, engineering and manufacturing facilities in the entire abrasive field make sure of this.

Also, repeat orders for Norton wheels will be filled with precise duplicates — eliminating production delays due to wheel variations. And filled fast! Because Norton maintains huge warehouses near you, stocking both regular and special requirements — for prompt regular and extra fast emergency deliveries. These stocks are supplemented by Norton distributor stocks in all important centers.

What's more, Norton Abrasive Engineers in your area are ready to call regularly, or whenever you need

plans. Building costs are down slightly, and when times improve they will go up, so we're carrying on. This may result in some temporary overages in space, but we very much doubt it.

* * * *

We have learned again in the last nine months the vital necessity of good planning and control, and even more important, the necessity of taking firm and immediate action when your control reports tell you things have slipped. We're proud of the action we've been taking lately, and would be prouder if it had been taken last November. Our general plans and results on a corporate basis used to be reviewed every 90 days, and now it's monthly.

* * * *

INVESTMENTS IN THE FUTURE PAY OFF

. . . by R. S. Ingersoll
President
Borg-Warner Corporation

THE STEPS BEING TAKEN by Borg-Warner to continue its economic growth are primarily long range in nature. Any action of an individual company of the corporation which might appear to take place during this period of economic decline and contribute to an upturn in its business would, undoubtedly, be the result of the application of sound management principles over many years rather than a hastily devised program initiated in the last week or month or six months.

* * * *

As we move through this year of business down-turn, we shall continue to exercise — and also to re-emphasize — the fundamentals of good management. We are bending every effort to develop new and improved products. We seek to produce and to distribute our products at lower costs.

We are preparing ourselves in every possible way to take advantage of the expansion of the economy which we expect in the near future. Accordingly, we shall continue without interruption our program of replacement and growth, and we expect to spend $18 million this year for capital improvements and expansions as against $20 million spent in 1957, the latter sum including the completion of several major expansions previously undertaken.

And we are trying in all ways — through increased efficiency in manufacturing, through rigid cost control, through added productivity, through intensified advertising and marketing and selling, and through renewed teamwork among all those in our employ at every level — to increase our sales and profits right now.

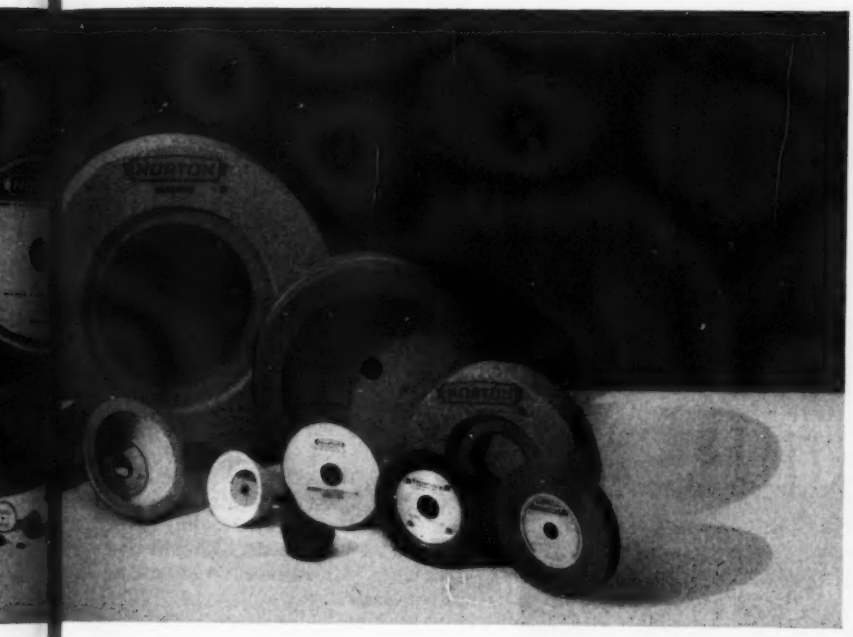
By these means, by these actions, we hope and expect to make our own corporate contribution toward the future growth of those industries with which we are identified, and to the economy as a whole.

LONG RANGE LOOK STILL IMPORTANT

. . . by Elisha Gray II
Chairman of the Board
Whirlpool Corporation

. . . IN THIS TIGHTENING OF THE SHIP we have been selective of course. We feel that it would be sound policy to make some exceptions which are essential for the long range health of the business but

. . . Continued on page 30



in abrasives?

them — providing expert aid in selecting the most efficient grinding wheels, to assure you lowest cost per piece ground.

Those are some of the reasons why Norton grinding wheels are your real money-saving bargains — bringing you the "Touch of Gold" that adds value and cuts costs every time it goes to work for you. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

NORTON
ABRASIVES
Making better products... to make your products better

W-1858

NORTON PRODUCTS Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals
BEHR-MANNING DIVISION Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

CIRCLE INFORM-A-GRAM KEY NO. 29

. . . Month's Talk from page 29

present equipment will be a prime factor in tomorrow's sales. Accordingly, since January 1st we have invested rather important sums of money, not only in design and tooling and creation of new products, but also in facilities and tools necessary for their production. Now, of course, when one feels the need for new products to bolster uncertain sales, you can't simply call up the engineering department and say, "What's new today boys? Let's get it out because we need more business." If you haven't built a pretty broad base of creative inquiry in recent past years you won't find much in the cupboard now. But it is possible in many circumstances to accelerate the plans that you have already had working and bring forward the introduction date of attractive new things.

* * * *

. . . my company is brushing aside the fluff, and re-examining the ABC's of our business. Very frequently you will find that some of the ordinary things, upon which you built your business, have somehow gotten lost in present confusion and are not being done at all. Somehow, in the search for the magic formula or the gimmick or the panacea that will solve our problems, we've lost sight of the fact that the ABC's of our businesses comprise our true strength and are the things on which we must focus with increased vigor when times become uncertain.

Therefore, we're doing three things. First, we are tightening up our belt. Second, we are presenting exciting new products and new models to the customer in an attempt to entice her to unlatch her purse strings and buy our wares. And third, we are presenting these new things to her on a more sensitively conceived plan to appeal better to the characteristics of the local market.

Eclipse
PRECISION GROUND from SOLID
END MILLS
Eclipse exclusive design end mills offer many advantages never before obtainable . . .
FLUTE FORM . . . uninterrupted ground form with no sharp corners.
CUTTING FACE . . . positive hook, smooth ground finish allows free flow of chips.
FORMED RELIEF . . . smooth ground finish provides greater strength to cutting edge.
EXACT UNIFORMITY . . . of index, helix, cutting face and relief.
KEEN CUTTING EDGE . . . for finer finishes, longer life and greater production at increased rates of feed.
For complete information write for Catalog E 57 M
ECLIPSE COUNTERBORE COMPANY
End Mill Division
Detroit 20, Michigan

CIRCLE INFORM-A-GRAM KEY NO. 30

Coming Events

Aug. 11-14. Society of Automotive Engineers. National West Coast Meeting. The Ambassador, Los Angeles.

•

Aug. 19-22. Western Electronic Show and Convention. Pan Pacific Auditorium, Los Angeles.

•

Sept. 8-11. Society of Automotive Engineers. Farm, Construction and Industrial Machinery Meeting, Production Forum, and Engineering Display. Milwaukee Auditorium, Milwaukee.

•

Sept. 10-11. American Die Casting Institute. Annual Meeting. Edgewater Beach Hotel, Chicago.

•

Sept. 12. Society of Plastics Engineers, Inc. Regional Technical Conference. St. Clair Inn, St. Clair, Michigan.

•

Sept. 14-19. Instrument Society of America. 13th Annual Instrument-Automation Conference, Show, and Computer Clinic. Convention Hall, Philadelphia.

•

Sept. 16-18. Electronic Industries Association. Fall Meeting. St. Francis Hotel, San Francisco.

•

Sept. 19. American Society for Quality Control. Fifth Annual San Francisco Bay Area Quality Control Conference. Stanford University, San Francisco.

2,000,000 DEFLECTIONS WITHOUT FAILURE.....Severe fatigue tests show Duraflex,® Anaconda superfine-grain Phosphor Bronze, permits far higher design stress

LICENSED PROFESSIONAL ENGINEERS, MEMBERS AMERICAN SOCIETY FOR TESTING MATERIALS AMERICAN SOCIETY OF MECHANICAL ENGINEERS NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

CONSULTING ENGINEERS THE CARLSON COMPANY MACHINE DESIGNERS

3457 WEIDNER AVE.
OCEANSIDE, L. I., N. Y.
TELEPHONE: RO 4-8181

Complete engineering and manufacturing services including design and development of special machinery, mechanical products and spring actuated mechanisms. Stress analysis, spring design, metallurgical data, heat treatment, plant layout, engineering reports, selection of materials and equipment. Tools and products.

The American Brass Company, October 25, 1957.
99 Park Avenue,
New York 16, New York.

Gentlemen, SUMMARY OF ENGINEERING LABORATORY REPORT NO. 102557

SUBJECT: Fatigue Life Test of "Duraflex", Superfine-Grain Phosphor Bronze and Commercial Quality Grade A Phosphor Bronze spring wire.

SPECIMENS: Compression springs made from each material, were coiled on arbors to avoid tool marks. The springs had squared ends, a high pitch to obtain high stresses and were heated after coiling in boiling water for 1 hour to relieve residual coiling stresses.

CALIBRATIONS: Each spring had its physical dimensions measured with micrometers and vernier calipers and was load tested in a Comaco Elasticometer Precision Spring Testing Instrument, before fatigue testing and after each 100,000 cycles of deflection to determine loss of load, if any.

FATIGUE TESTING: A representative number of springs from each material were tested simultaneously under identical conditions.

STRESSES: The stress in the springs, including curvature correction, during the tests were as follows:

Stress at Initial Installed Position	36,600 p.s.i.
Stress at Final Deflected Position	73,200 p.s.i.
Stress Range during deflection	36,600 p.s.i.

These stresses, for endurance limit testing, are exceptionally high for phosphor bronze spring wire - far higher than those ordinarily recommended for Beryllium-Copper or Stainless Steel for such severe service and are comparable to those used for good quality Spring Steel.

RESULTS: Grade A Springs broke at average deflections of 505,700.

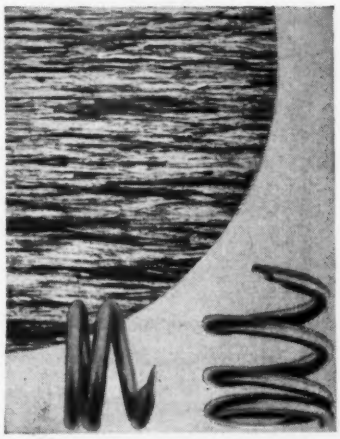
Duraflex Springs were still satisfactory with no appreciable loss of load at 2,000,000 deflections.

CONCLUSIONS: 1. Design stresses for Duraflex can be at least 33% higher than those used for Grade A Phosphor Bronze and as high if not higher than design stresses recommended for Beryllium Copper.

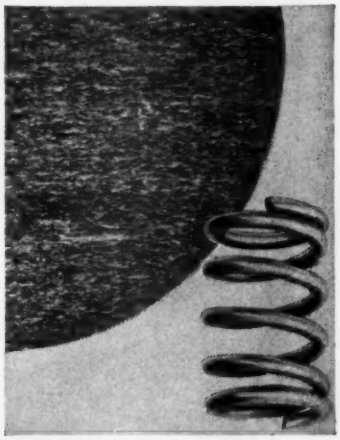
2. High endurance and long fatigue life at high stresses can be expected from springs made of Duraflex Phosphor Bronze.

CERTIFICATION: We certify the above summary of our report is accurate, in accordance with the facts and is true in every respect.

Respectfully submitted,
THE CARLSON COMPANY
Harold Carlson
Harold C. H. Carlson, P.E.
Licensed Professional Engineer.



Spring of Alloy A Phosphor Bronze, shown actual size, which broke just after 500,000 deflections. Micrograph (75x) shows typical grain structure of this metal.



Spring of Duraflex showed no appreciable loss of load after 2,000,000 deflections in same test. Micrograph (75x) shows typical superfine-grain structure of Duraflex.

Duraflex is a registered trade-mark for a higher quality phosphor bronze in sheet and wire forms, recently developed by American Brass Company research. Yet it costs no more than regular phosphor bronze. For detailed information—for a copy of the test data—write The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 8845

DURAFLEX
Superfine-Grain Phosphor Bronze
A product of
ANACONDA®
Made by The American Brass Company

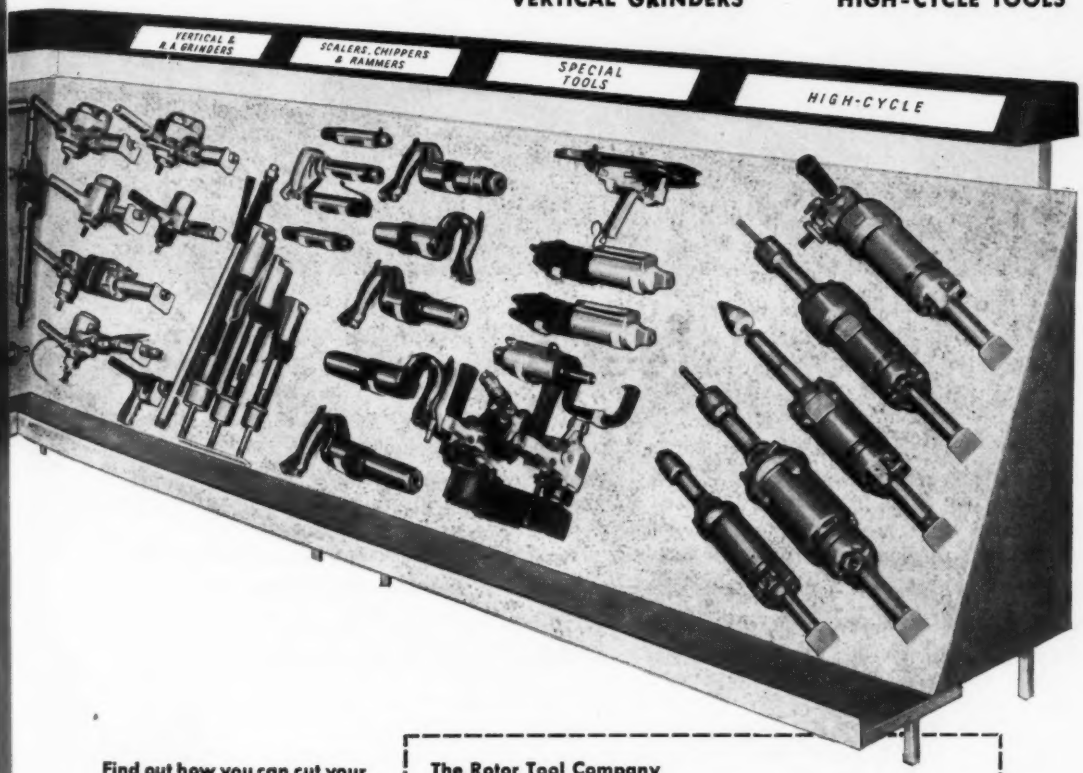
COMPARE!

(at our expense)

FOR POWER
FOR TIME SAVING
FOR LOW MAINTENANCE
FOR EASY USE

. . THE RIGHT TOOL FOR YOUR JOB!

ASSEMBLY TOOLS
DRILLS
STRAIGHT GRINDERS
VERTICAL GRINDERS
SCALERS...CHIPPERS...RAMMERS
SMALL WHEEL GRINDERS
SPECIAL TOOLS
HIGH-CYCLE TOOLS



Find out how you can cut your costs with ROTOR TOOLS. Ask for a free demonstration. Mail the coupon today.

The Rotor Tool Company
26300 Lakeland Avenue
Cleveland 32, Ohio

☐ Please demonstrate Rotor_____ in our shop.
☐ Send literature for_____

Company Name_____
Company Address_____
Your Name_____
Position_____
City_____ **Zone**____ **State**_____

CIRCLE INFORM-A-GRAM KEY NO. 33

Erickson Precision Expanding Mandrels Solve Machining Problems

One of a Series

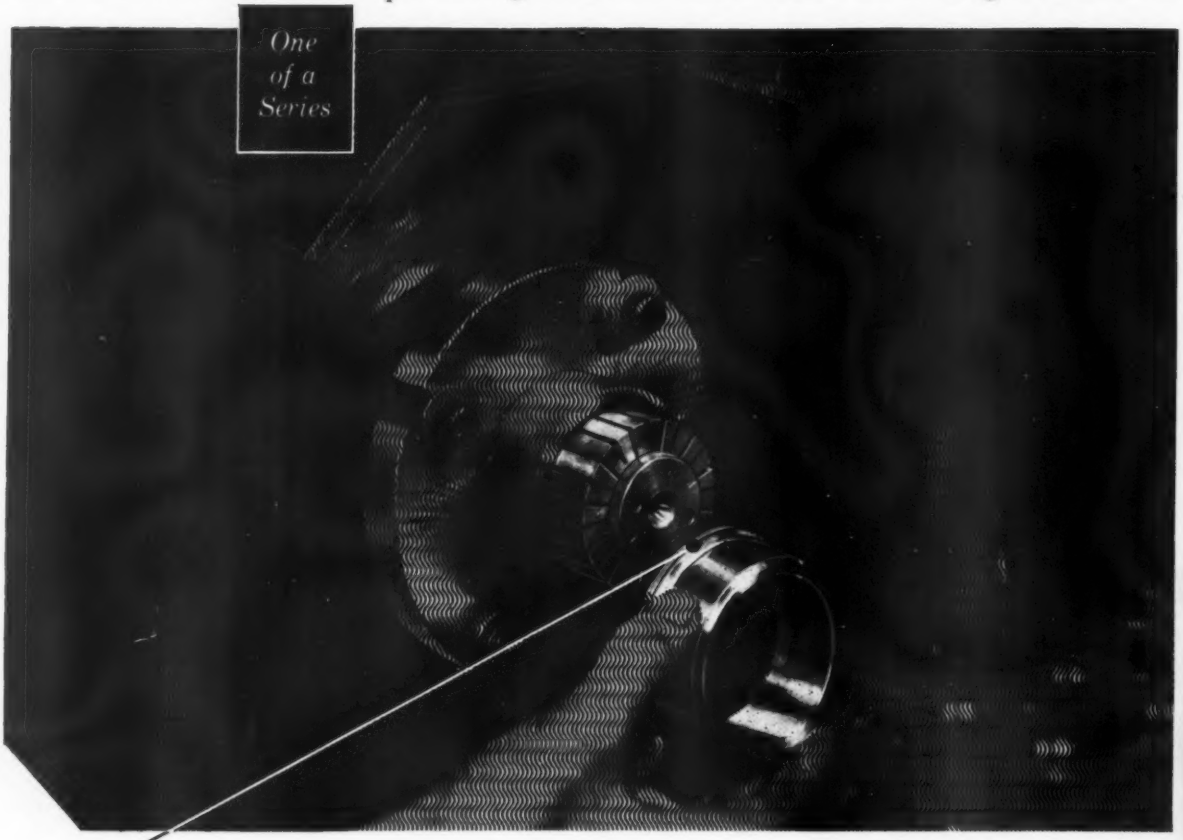


Photo: Courtesy Ex-Cell-O Corporation, Detroit, Mich.

e. g. stainless steel aircraft sleeves

Tolerances of the highest order are required on aircraft sleeves. And when the material is stainless steel this can lead to production problems.

But Ex-Cell-O Corporation short-circuits their problems by using an Erickson 4½" C Drawbar Expanding Mandrel on an Ex-Cell-O precision boring machine. By using the Erickson mandrel they are able to machine completely the outside diameters, face a shoulder and put chamfers on both the OD and the ID of the exposed end. Production is up, rejects and scrap are down.

If you have a production part requiring exceptional tolerances . . . if instantaneous release feature can speed loading or unloading—Erickson Precision Expanding Mandrels can pay real production dividends.

AA-6723

Collet Chucks
Floating Holders
Tap Chucks
Indexers

ERICKSON Holding Tools
.0005 Guaranteed Accuracy

ERICKSON TOOL COMPANY

34351-8 Solon Road • Solon, Ohio

Tap Holders
Air-Operated Chucks
Expanding Mandrels
Special Holding Fixtures

Plagued by tough holding problems? Then let us show you how Erickson Precision Expanding Mandrels speed production and slash costs of machining, grinding, assembling or inspection. Write for your free copy of Catalog K today.

CIRCLE INFORM-A-GRAM KEY NO. 34

TITANIUM BREAKTHROUGHS

WE HAVE JUST (YESTERDAY) RETURNED FROM A TECHNICAL FORUM conducted by the Crucible Steel Company. The subject of the forum was the research and development program of the company's Titanium Division which has resulted in three new heat-treatable titanium alloys now becoming available to the metalworking industries' product designers and fabricators.

The titanium industry has enjoyed a most unusual, even glamorous, career sparked by the pressures on procurement of manned military aircraft. In a brief ten years it has passed through periods of hectic demand accompanied by forced-draft expansion, followed by times of serious over-supply.

These are penalties imposed in any field of technology so intimately related to and dependent upon military end uses. Any industry or material saddled with the military as its principal user or customer is destined for a feast or famine existence.

To attain a modicum of economic stability a material of manufacture must aspire to acceptance and use in the industrial arts apart from the military.

In the interest of national security and military supremacy there must be no instigation of divorce proceedings by titanium against the military, but rather the attainment, in its own right, of separate maintenance.

The new titanium alloys, R'd & D'd by Crucible will go a long way toward establishing titanium as a self supporting member of the family of industrial and consumer product materials.

Although titanium's light weight as compared to steel is a factor in a number of non-aircraft applications, by far its most important characteristic in this field is the metal's outstanding corrosion resistance.

Crucible's new titanium alloys represent breakthroughs on both the applications and economics fronts. They have the unique advantage of being capable of being readily formed in the so-called solution treated or "soft" condition and then strengthened (to physicals heretofore unattainable with titanium) by simple thermal aging treatments.

On the economics front, titanium admittedly is expensive, but with new alloys uniquely easy to fabricate, this means that the cost of the formed heat treated part may be surprisingly low.

As noted, Crucible's titanium forum was an invitation affair, and like any other invitation affair, its importance can be gaged by the nature of the "acceptances". The forum leaders should be very gratified by the industry-significance of the attending editors.

A trade or technical publication editor knows his readers. He not only knows what they are doing, but he knows what they would like to do if given the tools and materials with which to accomplish their objectives. It is his job to "communicate" to them what they need — new tools, new methods, and new materials.

The variety of industries represented by the attending editors augurs well for titanium's ascendancy as a highly fabricatable material of many merits.

Crucible's know-how-seeking guest editors came from many and diverse fields of endeavor, ranging from metal working, electrical manufacturing, and chemical, through design, food processing, and purchasing, to automotive, foundry and missiles! Their interest in the new titanium alloys is dedicated to enhancing their readers' skills and attainments in those many fields.

E. Willard Pennington

editor

New Lamina Wear Plates Last Longer, Cost Less!

Now . . . save money and get better performance wherever you have sliding contact between flat metal parts! The principle of bronze electroplated on a steel backing originated with Lamina Bronze-Plated Guide Pin Bushings. Proven during countless millions of punch press hits, it is now being used successfully to produce flat wear plates.

This new concept in wear plate design combines the low cost, ready machinability and solid backing of steel with the long-wearing, non-seizing, free-running properties of a copper-tin bronze alloy. Lamina Bronze-Plated Wear Plates are flat, parallel, and can be easily machined to suit your application. Standard sizes available from stock. End costly wear problems and reduce expensive downtime now! Write for complete information.

Lamina
DIES AND TOOLS, INC.
P.O. BOX 31, ROYAL OAK, MICHIGAN

MANUFACTURERS OF LAMINA GUIDE PINS, BRONZE-PLATED BUSHINGS AND THE FINEST PRECISION PROGRESSIVE AND LAMINATION DIES.

CIRCLE INFORM-A-GRAM KEY NO. 36

Salvaging Waste Sheet Metal Pieces

by Joe Harner
Nevada, Missouri

IT IS SELDOM that there are waste pieces of usable size in the waste strips from blanking presses. Usable pieces, as a rule, come from punchings of various sized and shaped openings punched in larger blanks, and their number may run to millions of pieces a year.

A very decided saving can be made if these waste pieces can be economically used. Occasionally they can be sold for a small amount over the price of scrap to some company that can use them, and sometimes an attempt is made to store the more desirable pieces for some future use. Such storage is generally not recommended — usually they are sold for scrap.

The larger the company producing these waste pieces, the greater the possibility of finding some use for them. The problems of how to use the pieces economically are many. The pieces must (unless the volume is large) be hand fed into a blanking die, and as a rule, such dies can be guarded without much hindrance to the operator. Then, however, the blanked pieces must be hand fed (unless they are large enough to be handled by a vacuum pickup) into a stamping die. This presents a decided safety problem as the blanks must be placed between gage pins inside the stamping area.

This author for some years was faced with such a problem — utilization of hundreds of thousands of pieces about 2½" x 4½" from 28-ga galvanized iron. These pieces evaded any practical use until an opportunity arose for partial use in a small part somewhat resembling the letter "W" with a potential yearly requirement of 15,000 to 20,000 pcs.

The blanking die will not be described, for punching the blanks presented no problem. The waste pieces were all exactly the same size and would drop between the gage pins, thus relieving the operator of any safety hazard. A faster, but more expensive, method for feeding the pieces into the die could have been made. The expense, however, was not justified due to the small number required.

Description of Parts

The blank was too small to be handled with a conventional vacuum pickup. Hand placing these small blanks inside the stamping die could not be considered from a safety standpoint, and would also be too slow to be economical. A 60-ton Bliss open back inclinable press was available, so an unusual die was designed for it and for the work at hand. The die moved forward entirely outside the danger zone for loading; then, as the ram descended, it moved back into stamping position. When the die was completed, a few days production finished enough pieces for a year. The die has been in operation for the past five years without more than a few hours for maintenance, and it paid for itself in the first two years of use.

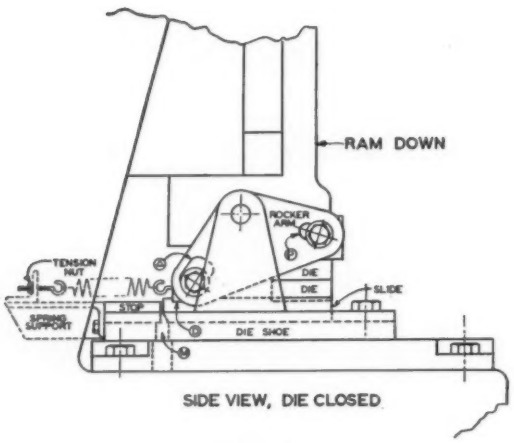


Figure 1

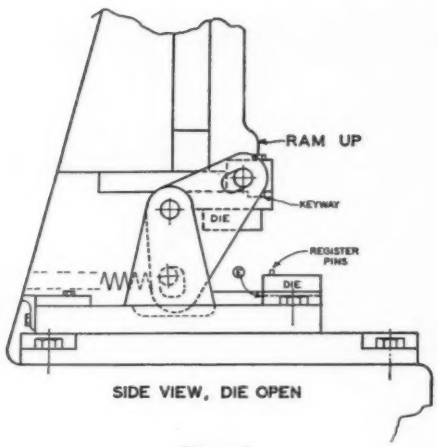


Figure 2

The principles of operation will be described, but no details of the die shape will be shown. This is because any type die may be used providing the gage pins or other projecting parts do not rise more than ½" above the die level. The construction of this die is not difficult, and it could be made in any machine shop. If the draftsman understands the principle of operation thoroughly and follows the construction through the shop, all parts should be rigid in construction.

The side elevation (Fig. 1) shows the die on the press, and the die parts are described from below: First there is the die shoe. This has a dovetail cut in it (Fig. 3) for the slide. There are also four hold-down holes, a stop at the back, and two waste holes as shown by "M" (Fig. 1) for dust and metal particles that might build up and prevent the die slide from seating properly. At the back are two springs for pulling the die slide against the stop. The spring supports, constructed from angle and T iron, are shown in Figure 1. The springs are attached to the die slide by two eye bolts screwed into the back of the bearing bar (Fig. 4).

The die slide is shown in Figure 4, and is made from cast iron and undercut as shown as a safety feature. If for any reason the die would fail to seat properly, the cast iron will either spring or break, thus preventing more serious damage. In actual operation such an accident has never happened. The die slide should also move easily and without play in the ways of the die shoe. The die is bolted to the front end of the slide as shown. At the

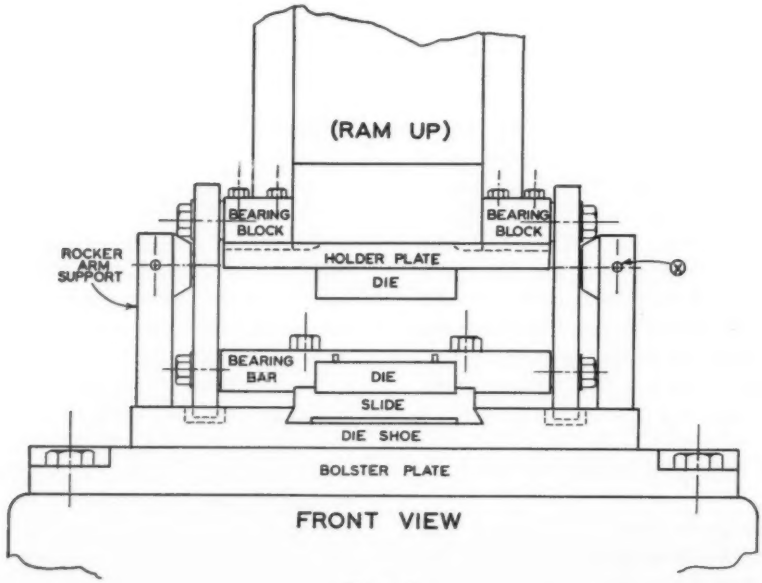


Figure 3

back is the bearing bar with the bearing on each end operating in the rocker arms. This bar is heavy to prevent springing and is set into the top of the cast iron slide 3/16" as shown at "D" (Fig. 1). The slide thickness extends up to the back of the die at "E" (Fig. 2).

The spring support (Fig. 2) is made by bolting a length of 2" x 2" x 3/8" angle iron to the back of the die shoe, and in the center welding a length of 2" x 2" x 3/8" T-iron flat side up. Welded crosswise on top at the outer end is a 6" piece of 2" x 2" x 3/8" angle iron, with two 3/8" holes of the same spacing as the eyebolts on the bearing bar. The 3/8" eyebolts are 6" long and are threaded up to the eyes. A nut on the outside of the angle iron enables tensioning of the springs.

The two springs about 12" or 14" long, 1" in dia and made from 1/8" steel wire should be of the pull type with eyes on each end. They should be adjusted until the bearing works perfectly in the oval hole in the rocker arm. This will pull the die slide back against the stop in time for the top die to descend vertically over the gage pins, and without any noticeable noise.

The two rocker arm supports are made from mild steel (Fig. 3). They are bolted to the die shoe from underneath with countersunk 1/2" machine bolts. The holes for the bearing shoulder bolts are drilled and tapped for 3/4". The bearing face is turned on a lathe and a 3/8" hole drilled and tapped into the side of the bearing as shown by "X" (Fig. 3) for an Allen type set screw. This screw goes directly in on the threads of the shoulder bolt and keeps it from working loose.

Principles of Operation

The details of the die face are not shown, for as a rule any conventional type die can be used. All parts projecting up on the die or down from the top die as well as gage pins must be considered in designing the die. This is because the die must open and close vertically to a height slightly more than the highest pin or projection. This vertical raise is accomplished by the opening "A" (Fig. 1) in the rocker arm. As the ram rises, the die opens vertically until the bearing moves over and closes space "A", thus allowing the upper die to clear the register pins. Then the slide moves forward until it reaches its maximum limit. When the ram descends, it operates in reverse with the two springs pulling the slide back into position so that the top die descends vertically on the lower die. The wider the space "A", the less the distance the die travels forward and the greater the vertical lift of the

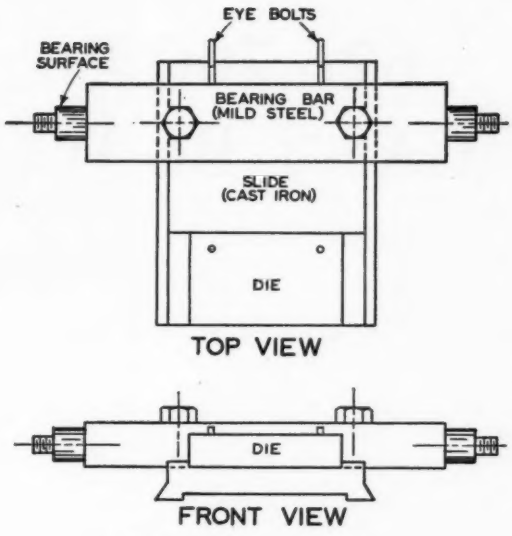


Fig. 4. Slide assembly details.

ram before the slide starts moving forward. The space "P" shown on the top bearing of the rocker arm is quite essential as this bearing moves through an arc. The designer must carefully calculate these bearing openings in laying out the die and leave ample allowance for the vertical movement.

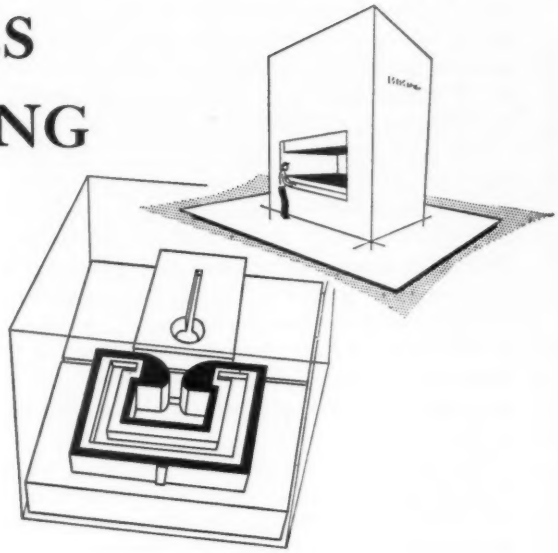
The die holder plate is made as shown in Figure 3. The bearing blocks are bolted to each end, and the bottom of the blocks should be keyed (Fig. 2) to the top of the plate to prevent the blocks from moving in any way. Care must be taken to see that they have clearance with the projecting sides used in bolting the ram to the holder plate.

This die is self-contained and especially easy to put on the press. It is slid in on the bolster plate until the ram holes match with those in the die holder plate. All mounting bolts are positioned, first for the die holder plate, then for the die shoe. All bolts are then secured tightly. The bearings and the slide must be kept lubricated when in use and in no case must the stampings be allowed to collect on the slide in back of the die. If the bearing bar keeps a few from going farther, they should be pushed out immediately.

Under no circumstances should the operator ever place his hand in a die for any purpose whatever. Removing the stamped pieces from the die can be done in several ways — by air, with a hook, or by a spring-loaded pin. The accidental tripping of a press while in use will not injure the operator, though it may scare him into being more careful. With the proper height gage pins, there is little danger of the pieces getting in back of the die.

end

626,700 PIECES CAN'T BE WRONG



The purpose of one particular development at Brookhaven National Laboratory on Long Island, now in its sixth year, is to build the Synchrotron. This research apparatus, to be the world's most powerful atom smasher, is made up of 240 fifteen-ton magnets, placed 10 ft. underground in a circle whose circumference is one-half mile. It will be used for accelerating particles of matter to approximately 180,000 mps to bombard the nuclei of target atoms. Thus they can be broken down for a study of their sub-atomic parts, and combined to produce new matter.

The large magnet cores, each made up of approximately 2800 laminations, are blanked from sheet steel and permanently assembled. It is the size of these laminations, 33″ x 39″, and the extreme accuracy required of their configuration (alikeness one-to-the-other) which has required exceptional engineering talent.

Hence, this is not just a generalization pertaining to the existence of a large carbide die and its use. You will find sufficient detail and data to make this extremely informative. There are a number of interesting steps in the making of these cores; of particular interest is the design and construction of the carbide die that blanks the laminations.

Information for the story was given to William E. Hoffman, Associate Editor, by:

Art Chambers
Vice President
EGLINTON CARBIDE PRODUCTS, INC.
Wyandotte, Mich.

Arch Dunn
Chief Tool Engineer
EDDYSTONE DIV. OF BALDWIN-LIMA-HAMILTON CORP.
Eddystone, Pa.

A. E. Glen
Metallurgical Products Dept. of
GENERAL ELECTRIC CO.
Detroit, Mich.

THE SIZE OF THIS DIE MAKES IT UNIQUE — although its construction is distinctive also. The combined cutting edges (punch and die) approximate 400 linear inches of carbide. The overall size of the die is 43″ x 60″, blanking a part 33″ x 39″. A similar blanking operation in Italy required the use of 10 steel dies, evidence that experience and a complete understanding of the materials used here was necessary to have made the design, construction, and operation of this die successful. Later in the article you will be interested in reading about the processing and final use of these large blanks. First however, we would like to direct our discussion to this engineering feat, the carbide die.

The complete lamination order called for a total of 626,700 pcs with practically no burr. Accuracy over the 33″ and the 39″ dimensions of the punch and die allowed a tolerance of only 0.0002″. The blank was allowed not more than 0.0005″ deviation from the master, so clearance between the punch and die was held to 0.0017″. At the time of this writing 100,000 pcs had been blanked, the last showing a burr height of no more than 0.0002″. Thus great success is indicated for the type of construction employed.

The most prominent difficulty *anticipated* in the building of this die was the establishment of the stable cutting surfaces of the punch and die over such an extensive contour. Basically, tungsten carbide cut-

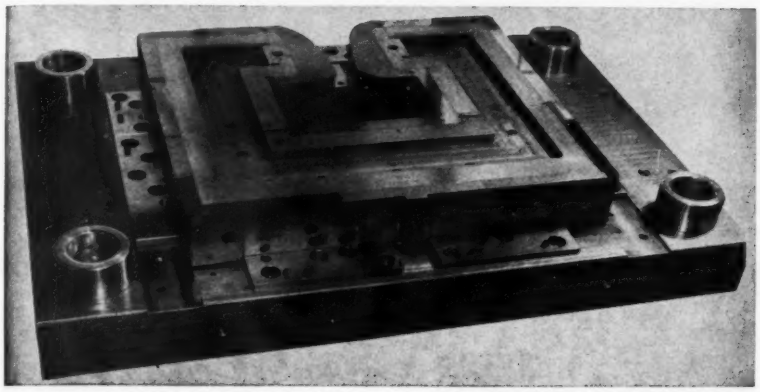


Fig. 1. Although relative size can be appreciated better from Figure 2, this is an excellent view of the lower portion of the die. Square keys between the 200 lineal inches of carbide cutting sections are shown. And although it might appear that the carbide sections are cemented, they are actually bolted in—blind holes having been tapped in the carbide.

ting sections were mounted on Meehanite blocks which in turn were mounted on a cast semi-steel plate. The Meehanite blocks, used because of their fine grain, uniformity, and resistance to fatigue, were annealed after rough machining. Then they were ground and scraped for flatness. The carbide sections were roughed out, ground, and then lapped as individual pieces before mounting. Aside from the stability expectation, this construction was adopted to make it possible to remove any portion of the cutting surfaces for grinding should it be damaged by accident. In case it would be necessary to remove individual carbide sections or inserts, they could be ground and replaced with the appropriate shims. Otherwise it would be necessary to resharpen the entire die, requiring complete disassembly. Barring an accident, the die will do its complete job without resharpening.

The other feature of the demountable carbide section construction allows for throat section reversal. The ability to work this out was an engineering feat which saved the price of one die. Since the magnets do not all have the same throat aperture, two lamination designs are called for, differing only at the throat. The two carbide sections at the throat can be flipped end-for-end to produce a new part contour.

Due to the exacting requirements of the throat section, a new technique was used in pre-forming the carbide to approximate size. The (Carboloy grade 55B) "preforms" were furnished by the Metallurgical Products Department of General Electric, close to final size, allowing a minimum of grind stock. This was attained through the use of plastic form templates furnished by Eglinton. These templates, used on a 10:1 tracer machine, compensated for sintering with an 0.840 shrink factor.

The shrink factor was obtained by taking a sample from the batch of carbide to be used and sintering it; after which a size check was made and compared with the pre-form's dimensions before sintering.

Since the die was to be completed, shipped, and put into operation during the winter months, another major consideration was the difference in the expansion coefficient of the Meehanite and carbide. The carbide was keyed and bolted in, because, if constrained, sections of this size could easily crack up. Although a temperature differential of 50° was experienced, no ill effects were experienced while shipping from Eglinton to Baldwin-Lima-Hamilton. All cutting sections were loosened for travel, and re-aligned and tightened before use.

The throat sections were ground from master templates. Final contour grinding was done on a Parker-Majestic surface grinder, with a vertical spindle attachment. A special fixture was used to hold the work and the template and grinding was done with 5" x ½" diamond grit wheel, using 100 grit for roughing and 220 grit for finish.

It would appear, since 0.050" to 0.060" grinding stock was left at the throat and as much as ⅛" allowed on the straight sections, that the greatest expense would have been entailed in stock removal. We are told that this was not so, but that the achievement of large area flat sections (flatness in 40" was within 0.0002 TIR) and inspection were the great time consumers.

The tapped holes in the carbide sections, for the purpose of fastening them to the Meehanite, were produced by electrical disintegration.

An interesting estimate was given: had a steel die been used for the blanking of these laminations, it would have been necessary to resharpen it after every 50,000 pcs. From performance to date it is well within reason to expect that the entire 626,700 pc lot will be run off without resharpening. Also, for further comparison between this die and a steel die, it is estimated that about 12 man-days would be lost during each sharpening of a steel die this size. Assuming that it would be

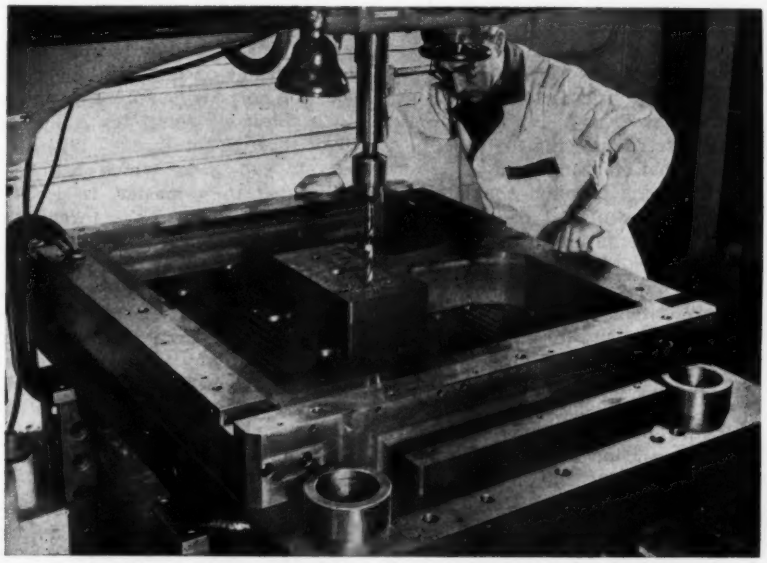


Fig. 2. Shown under construction is the upper, or punch member, of this king size carbide die. Strippers are not shown. Little does this man know how his life may be affected by the help of this die.

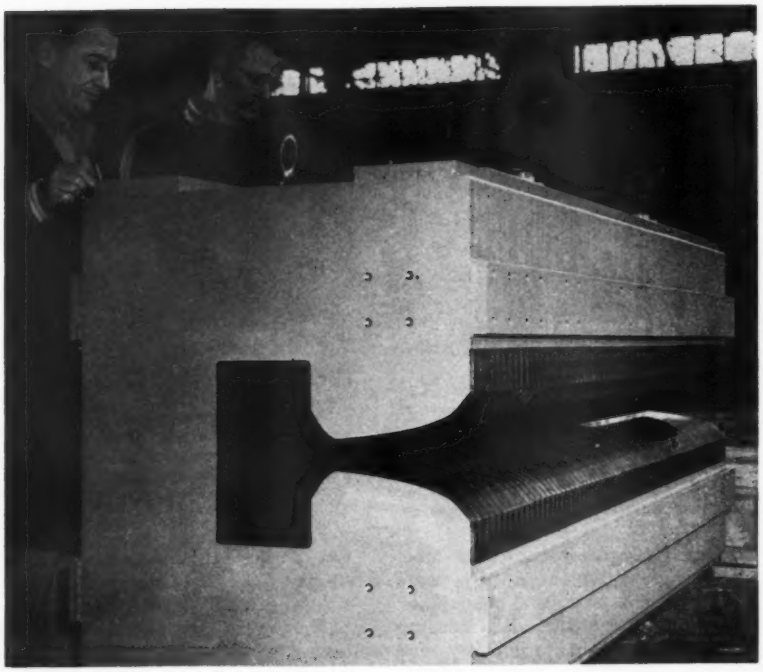


Fig. 3. An excellent view of the assembled magnet core. It might seem that there are fewer than 2800 laminations here; the effect comes from grouping with burr orientation — 20 up, then 20 down, when stacking.

possible to maintain the same accuracy, the cost of the carbide die is only one-third more than the cost of a steel die.

. . . The making of the magnets:

The laminations go through five major steps, in process, to become a 15-ton assembly. The first step in the preparation of these "little" cores is the shuffling of the 0.031" thick silicon steel (AISI M36) sheets. In order that the magnets would have uniform dielectric properties, shuffling was considered necessary to thoroughly intermix the sheets which came from various "heats." Shuffling is accomplished by creating two rows of stacks. One man "builds" each row, taking sheets from a dolly being pulled along between the rows. Two men progress the length of the rows, each taking a piece from the dolly and placing it on his next successive stack. The way it works out, each pile gets one piece each time the dolly passes the length of the aisle between the two rows.

Great care has to be taken in all handling as the light coating of organic varnish insulation applied to the Allegheny Ludlum steel cannot be penetrated.

Actually, two dies are used in making this stamping, both being used simultaneously in the same press. The parts are worked in a through-the-press operation by two men — one on each side.

The first die, which does not use carbide cutting surfaces (since no real accuracy, or controlled burr condition is necessary), is for the purpose of stress relieving the sheet befor the final blanking.

After being blanked the laminations (and end plates) are stacked in a fixture, alternating 20 with burr up (if you can call 0.0002" a burr) and 20 with burr down. Alignment is extremely critical and is accomplished by locating in the throat, and at the rear by a locating boss provided during part design. Then without removal from the stacking fixture the piles are hydraulically compressed (80 tons) and strap bars are bolted to the end plates. The unit is then removed and fillet welds are run on both sides of the straps to the lamination mass.

Next, three locating pads and two locating holes used for setting up the magnets are milled and bored. This is done on a Giddings & Lewis horizontal boring mill having a stationary table. Location for this machining is also done from the throat. These locating pads and holes are also used for setting up an electronic inspection gage, and for positioning the magnets for final use by optical instruments. Accuracy here is important too, since in final use the maximum allowable error in misalignment of any pole-tip, of any magnet in the ½ mi circle, is 0.002".

Inspection of each magnet core is a check for any vertical or horizontal deviation of any laminations from a straight line in the pole-tip (throat) area. This is done by locating a reference frame on the pads and in the locating holes, which presents targets to a telescope setup for a line-of-sight through the throat. With this, an air gap gage, which has been calibrated to a master, is used in various positions in the throat. In any one position, it is adjusted until a null is reached on a recording instrument, at which time a sight is taken through the telescope to check the alignment of the targets on the gage head. Actually this gives an accurate record of what the proton will "see" in its path through the magnet field. This critical gage indicates no salvage work necessary to date.

This research "tool," the alternating gradient Synchrotron, will be capable of creating 25 BEV (billion electron volts). It will be used for the approximate purpose of other similar less powerful research apparatus, like the Cyclotron, Bevatron (6 BEV) and the Betatron, but its designers boast of new design concepts which allow fantastic electron voltages from a relatively smaller installation.

The cost of an installation such as this is an estimated $26 million. We should be proud that we have the resources to carry on research and development of this magnitude. A similar installation being constructed in Switzerland is, due to cost, being shared by several European governments. Also, it is interesting to know that this machine will have three times the energy of an installation (10 BEV) completed in Russia in 1957.

Another development is that even greater power expectations than originally conceived will probably be realized. They know that the oval-shaped continuous vacuum tube traversing the throat openings will carry the protons at a speed directly proportional to the electron voltage. Since it is desirable to have the greatest speed possible, the Brookhaven people are quite elated to know that they may have even more than the 25 BEV anticipated. The proton speed attained is enhanced as the stacking-factor of the laminations goes up. It has been found that the stacking-factor checks out to be 97% of the weight of solid metal instead of the 95% expected. This increase is in itself a direct mathematical relation: stacking-factor to engineering ability. end

For Your Notebook:

NOMOGRAPH FOR MACHINE CUTTING TIME

by W. O. Becker
Staff Industrial Engineer
MERGENTHALER LINOTYPE COMPANY
Brooklyn, New York

ESTABLISHING THE MACHINE CUTTING TIME for a turning, milling, or drilling operation is a time consuming calculation for engineers and estimators. To reduce this time to a minimum, the nomograph as shown on the next page was developed for use by our methods engineers.

In any calculation of this type, certain factors are, or must be, known such as:

Surface feet per minute for the work material.

The diameter of the work for turning operations; cutter diameter for milling; or drill diameter for drilling.

Recommended feed in inches per revolution; or chip load per tooth for the work material.

The length of cut including any approach or run-out of tool.

The number of teeth in a milling cutter.

With these factors available, the nomograph is used as follows:

Set straight edge across the given surface feet per minute (scale 1) and diameter-inches (scale 2) to obtain revolutions per minute (scale 3). Adjust this reading to the nearest available machine speed.

From this (adjusted) point set straight edge across to inches per revolution (scale 4) and read inches per minute on scale 5. The inches per revolution or inches per minute are to be adjusted to available machine feed.

From the adjusted inches per minute set straight edge across to length of cut, scale 6, to read minutes per cut on scale 7.

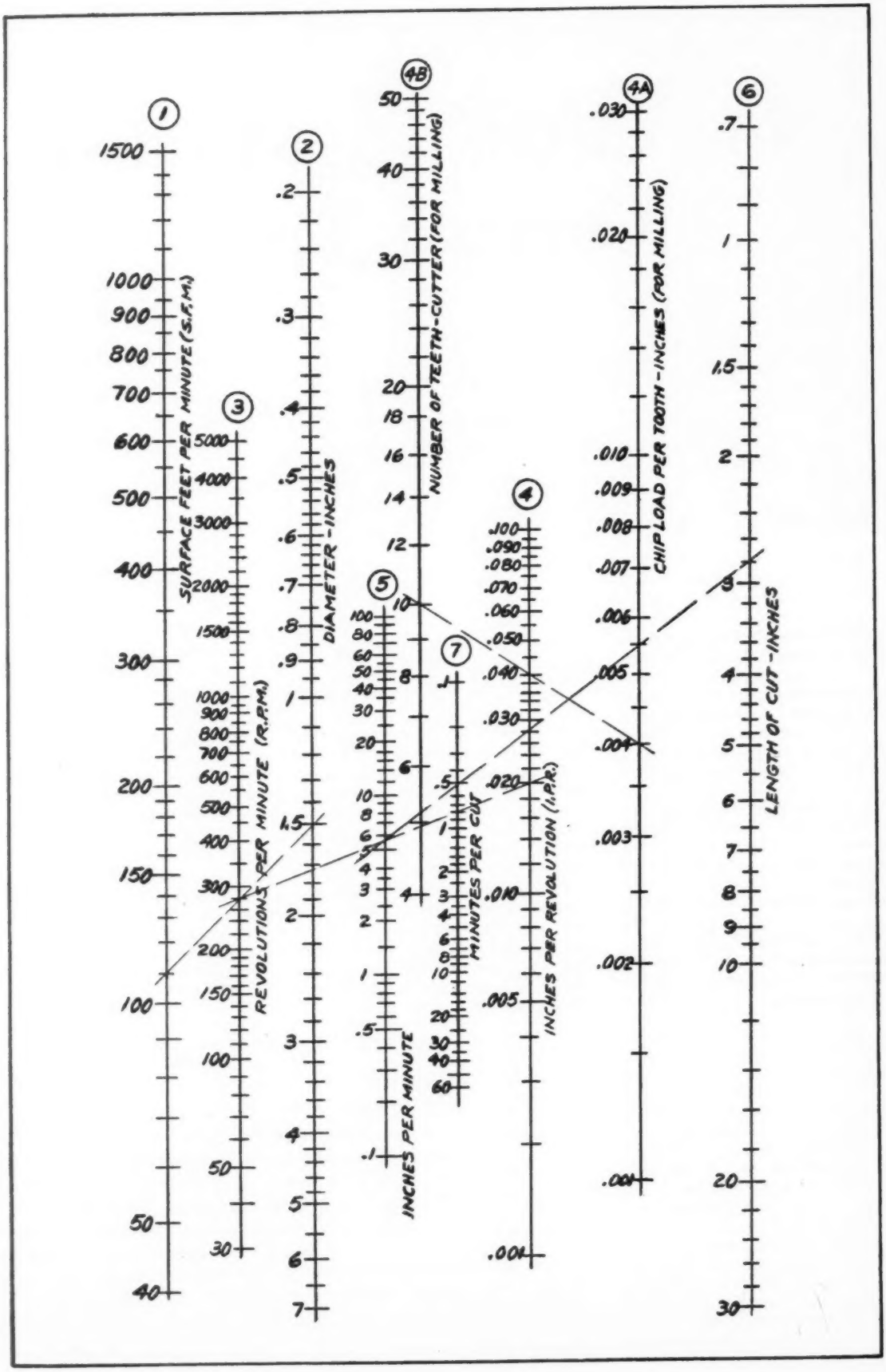
Where a milling operation is under consideration, the inches per revolution can be established by setting straight edge across chip load per tooth (scale 4A) and number of teeth (scale 4B) to obtain inches per revolution on scale 4.

This nomograph has proved of value, particularly where different feeds and speeds are to be compared. The work involved in making these computations is eliminated as the results can be obtained directly from the chart.

end

Editor's Note: W. O. Becker authored the very fine article on "Charts for Determining Milling Cutter Approach and Runout for Rapid Machining," TOOLING & PRODUCTION, April 1958, page 80. In it, he said, "The machining time is a purely mathematical function, taking into consideration: feed, speed, tooling, and the cut to be made." To aid his methods engineers in expediting the routine calculations called for, Mr. Becker devised the accompanying nomograph. You, too, will find it a fast working mathematical tool.

E. W. P.


1
SURFACE FEET PER MINUTE (S.F.M.)
1500
1000
900
800
700
600
500
400
300
200
150
100
50
40
3
REVOLUTIONS PER MINUTE (R.P.M.)
5000
4000
3000
2000
1500
1000
900
800
700
600
500
400
300
200
150
100
50
30
2
DIAMETER - INCHES
.2
.3
.4
.5
.6
.7
.8
.9
1
1.5
2
3
4
5
6
7
4B
NUMBER OF TEETH - CUTTER (FOR MILLING)
50
40
30
20
18
16
14
12
10
8
6
5
4
3
2
1
.5
.1
5
INCHES PER MINUTE
100
80
60
50
40
30
20
10
8
6
5
4
3
2
1
.5
.1
7
MINUTES PER CUT
.5
1
2
3
4
6
8
10
20
30
40
60
4
INCHES PER REVOLUTION (I.P.R.)
.100
.090
.080
.070
.060
.050
.040
.030
.020
.010
.005
.001
4A
CHIP LOAD PER TOOTH - INCHES (FOR MILLING)
.030
.020
.010
.009
.008
.007
.006
.005
.004
.003
.002
.001
6
LENGTH OF CUT - INCHES
.7
1
1.5
2
3
4
5
6
7
8
9
10
20
30

How Much 'Wrench Pull' Do You Use ... on Your Wheel Sleeves?

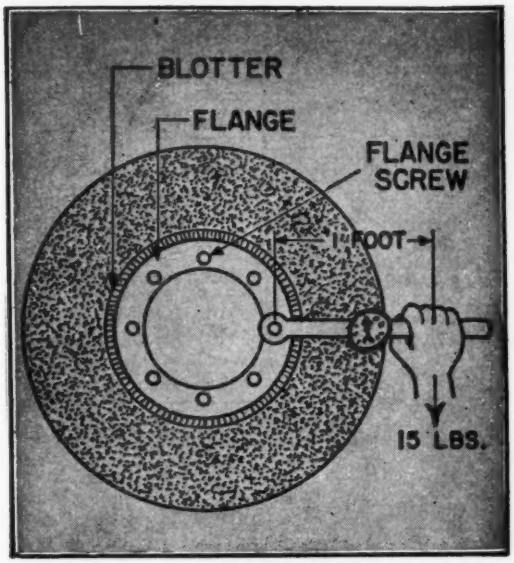


Fig. 1. Measuring torque.

Excessive tightening of flange screws can "spring" flange sufficiently to cause wheel to break, so use a torque wrench.

by Ralph N. S. Merritt
Product Safety Engineer
NORTON COMPANY
Worcester, Mass.

ABOUT ONE-THIRD OF ALL GRINDING wheel breakages are caused either by worn or sprung flanges or other mounting equipment, or by faulty wheel mounting procedure. This situation indicates a lack of knowledge on the part of wheel users as to how the stresses in a rotating wheel are distributed, where the area of greatest stress lies, and just how much "wrench pull" to use in mounting sleeve type wheels as used on cylindrical, crankshaft, and cam grinding machines.

The stresses tending to rupture a rotating grinding wheel are greatest at the arbor hole. This critical central zone, therefore, must be protected from the additional operational stresses from mounting and driving the wheel — the reason why the American Standard Safety Code regulations on flange design and mounting techniques are so important in grinding wheel safety.

If the wheel hole is small (same size as machine arbor), the flanges can be large enough to place the mounting and driving stresses in the wheel well outside the critical zone around the wheel hole (Fig. 2). Tests show that the internal stresses from rotation decrease as the distance from the hole increases. In fact, at points on the periphery of an area whose diameter is one-third that of the wheel, the bursting stress is halved, leaving ample wheel strength for the mounting and driving stresses imposed

Reprinted from GRITS AND GRINDS, published by Norton Company.

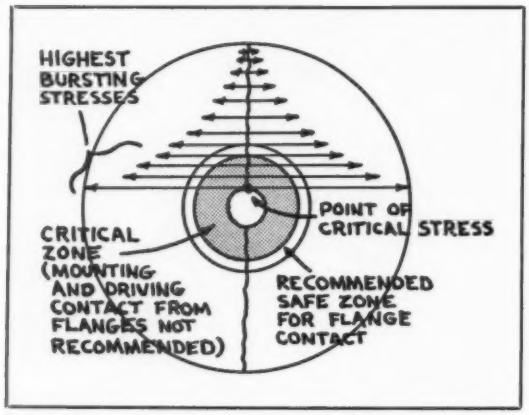

HIGHEST BURSTING STRESSES
POINT OF CRITICAL STRESS
CRITICAL ZONE (MOUNTING AND DRIVING CONTACT FROM FLANGES NOT RECOMMENDED)
RECOMMENDED SAFE ZONE FOR FLANGE CONTACT

Fig. 2. Relative bursting forces (rotational and thermal combined) for small-hole wheels.

by the flanges. The Safety Code regulations requiring matching recessed flanges at least one-third of the wheel diameter are based on these stress distributions to assure safe mounting procedure.

Large-Hole Wheels Need Special Care

As the wheel hole increases in proportion to the outside diameter, the resulting rotational stresses will increase quite rapidly, reducing the factor of safety. This condition becomes more serious as the hole size approaches one-half the wheel diameter, and to assure an adequate margin of safety, the maximum safe operating speed (peripheral) should be reduced.

There are three basic reasons why large-hole grinding wheels require much more care in mounting than small-hole grinding wheels to assure safe operation.

1. Where the outside diameter is the same, the wheel with the larger hole will be the weaker, since the internal stress at the hole from rotation increases as the hole diameter becomes larger.

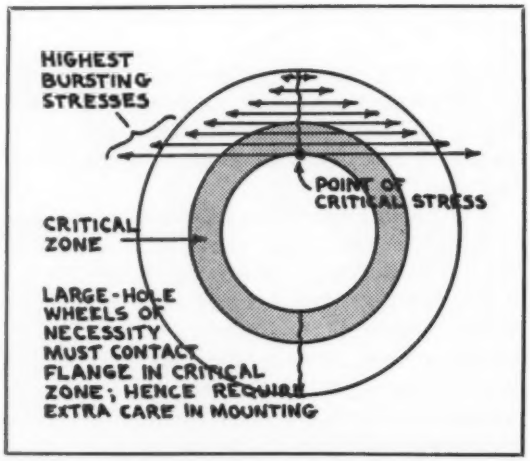

HIGHEST BURSTING STRESSES
POINT OF CRITICAL STRESS
CRITICAL ZONE
LARGE-HOLE WHEELS OF NECESSITY MUST CONTACT FLANGE IN CRITICAL ZONE; HENCE REQUIRE EXTRA CARE IN MOUNTING

Fig. 3. Relative bursting forces (rotational and thermal combined) for large-hole wheels.

2. This bursting stress does not decrease as rapidly at points toward the periphery as in small-hole wheels. Hence, there is no "safe" zone for flange pressure (Fig. 3).

3. The conventional flange design for large-hole wheels necessarily permits only a limited radial contact between flange and wheel, and generally requires 6 to 12 separate screws to secure the flange. This means that dangerous, variable mounting stresses will be set up in the wheel if the screws are tightened too much or not all the same amount, with the result the wheel may break when rotational stresses are added upon starting the wheel.

Because of the greater care necessary in mounting large-hole wheels, for the reasons just outlined, special attention must be paid to size and design of flanges and to mounting technique. These precautions may be summed up as follows:

- Check flanges for dimensions (See Table 15 in Safety Code for flanges used as wheel sleeves for precision grinding), particularly making sure the recess is adequate, and then check the flanges periodically for flatness, burrs and wear.
- Use only new, clean blotters between wheel and flanges each time the wheel is mounted.

Tightening Procedure

1. Tighten the mounting screws carefully, and in criss-cross order, as shown in Figure 4.

2. Tighten the screws in two stages. First, tighten them all lightly, using the criss-cross procedure. Then tighten each screw to the proper ft-lbs following the same sequence as before.

This orderly and careful procedure in mounting large-hole wheels will insure uniform distribution of the moderate stresses set up in the wheel. The torque selected should be just enough to drive the wheel without slippage. Higher torque would increase the stresses unnecessarily and perhaps dangerously.

Torque is generally expressed in "foot-pounds." This term represents the force of "wrench pull" in pounds multiplied by the length of the wrench in feet (Fig. 1). Uniform, correct (no more than necessary) wrench torque on all mounting screws is essential for the safe operation of large-hole wheels.

Use of Torque Wrench

A torque wrench offers the only positive control over the flange screw tension. This

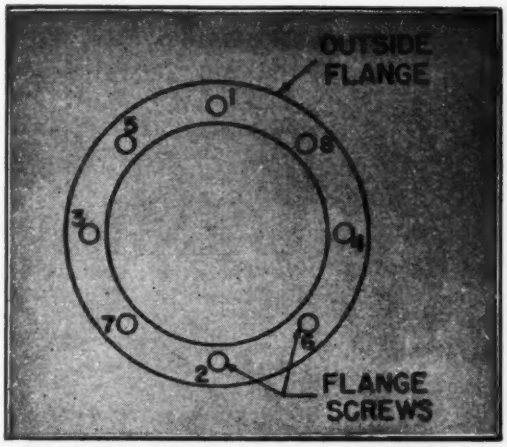


Fig. 4. An example of the order of tightening: 1-2-3-4-5-6-7-8.

wrench consists essentially of a lever with a right-angle adapter to fit the screw head, and with a suitable dial gage, scale, or pointer to indicate directly the amount of "pull" being exerted.

A torque of 15 ft-lbs has been found to be a good limit for mounting large-hole, sleeve mounted wheels on plain cylindrical, crankshaft, and cam grinding machines made by Norton Company and other grinding machine builders employing the same basic design of wheel sleeve. This 15 ft-lbs is generally sufficient for normal grinding operations where the screw threads are in good condition and a proper fit has been maintained.

On certain heavy duty operations, a torque higher than 15 ft-lbs may be necessary to prevent wheel slippage. In such cases, the torque should be gradually increased by small uniform increments, say five ft-lbs, until slippage is overcome. The proper torque can then be established as standard for that operation in the future.

A torque wrench is strongly recommended for all precision wheel mounting where it is possible to maintain ideal conditions of mounting threads so that the screws turn easily in the threaded holes and can be seated by finger pressure. Otherwise, the effective torque pressure will be reduced by the amount required to simply turn the screw until it is seated, unless an accurate compensation is made.

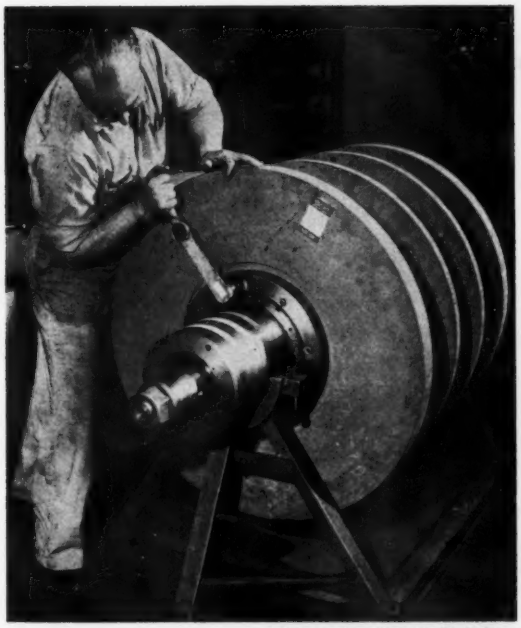


Photo courtesy Snap-On Tools Corp.

Fig. 5. Where several wheels are mounted on the same spindle a torque wrench is indispensable for tightening the flange screws uniformly and just the right amount.

It might be mentioned that in the case of rough grinding (snagging) the wheels are generally mounted with hand socket wrenches rather than torque wrenches because of the obvious mechanical problem of maintaining the flange screws to turn freely. A standard length wrench to apply the proper "pull" by hand only should be used. No hammer or wrench extension should ever be used, as this may very well increase the stresses beyond those necessary to just drive the wheel.

If care is taken to see that the American Standard Safety Code regulations for mounting wheels, together with the recommendations outlined in this article, are strictly observed, a great many grinding wheel accidents can be prevented.

end

Coming Soon:

TOOLING & PRODUCTION Looks At...
Short Run Automation
Q-C and Automatic Inspection
Machine Capability
Automatic Assembly

MANY NEW MACHINES UNVEILED AT TWO SUMMER SHOWS

Advances in machine tools and coated abrasives seen under power at "private" shows put on by Cleveland's Motch & Merryweather Machinery Company and Troy's Behr-Manning Company.

THERE ARE A LOT OF NEW AND IMPROVED machines available to speed and simplify production operations, visitors to Motch & Merryweather Machinery Company's Machine Tool Show and Behr-Manning Company's Third National Coated Abrasives Show this summer found, and the current "slack" time is a good time to compare notes on them and plan accordingly for the soon-expected pick-up in business. About 6,000 machine tool and coated abrasive users scrutinized the more than 200 pieces of equipment demonstrated under power at the shows in Cleveland and Troy (N.Y.), respectively. Here's a run-down on some of what they saw:

At Behr-Manning's Abrasive show in Troy, the visitors found that centerless grinding with abrasive belts is gaining in importance in metalworking . . . that cylindrical grinders can be converted to belt use with little additional equipment . . . that more through-feed automatically-gaged machines are now available . . . that machine manufacturers are putting more "beef" into their designs for more rigidity and accuracy . . . and that sheet stock can be ground more economically before forming operations than by grinding the finished parts . . . The list of improvements and additions is almost endless.

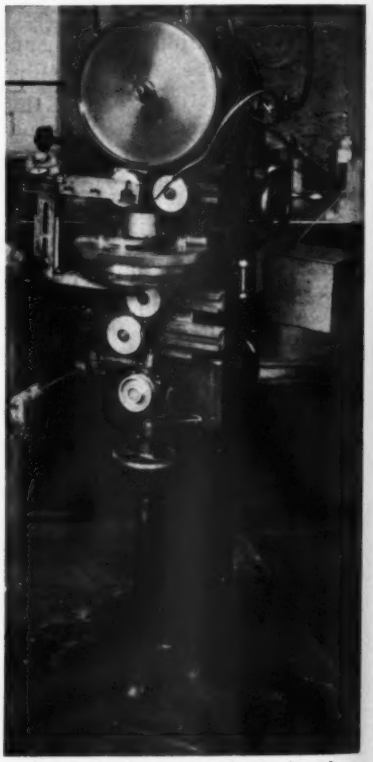
The show also gave Behr-Manning a chance to officially open its new million-dollar Product Engineering building. Many of the machines demonstrated at the show will remain in the building as part of the company's research program and service to prospective coated abrasive users to find more and better ways to use their products. The company does not make or sell any grinding and finishing machines. That is why they invited machinery manufacturers to set up shop at their show; to convert the yet unconverted to using coated abrasives and to keep coated abrasive users up-to-date on modern methods and equipment.

Seen for the first time at Behr-Manning's show was a cylindrical grinder, made by Production Machine Company, which uses abrasive belts instead of conventional abrasive wheels. It can be used for precision grinding of metal, plastics and rubber bars, tubes and rolls; has a 4" dia x 18" long capacity, and takes a belt 6" x 168".

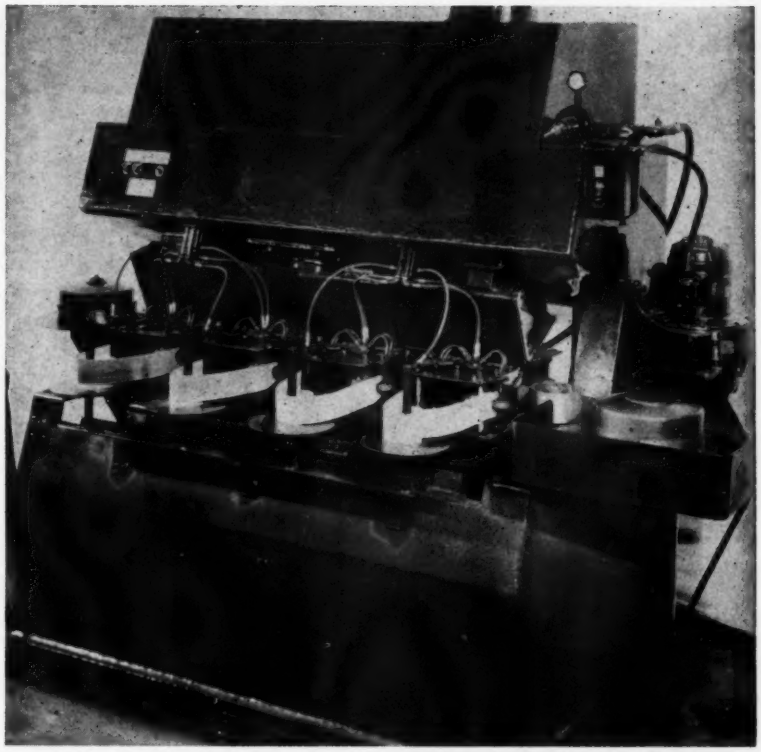
A giant among the machines on display was Hill-Acme's 50", 150-hp belt grinder for mechanical descaling and heavy stock removal from sheets. This one is more flexible than previous models, introduced earlier this year, and can be operated at from 1,000 to 6,000 sfpm, fed at from 6 to 88 fpm, and used for wet or dry grinding. Machines such as this one are making it advantageous for manufacturers to grind sheet stock before forming operations rather than after. An example is in the production of automobile bumpers, where it is easier to machine grind the steel before forming than to hand grind after the curved parts are formed.

For centerless grinding with abrasive belts, which is becoming more common, Engelberg, Inc. (formerly Engelberg-Huller Company), Production Machine Company, and Stephen Bader Company had equipment on display. The latter firm makes an extremely flexible 3-wheel Space Saver grinder for finishing intricate contours with a thin abrasive belt. Now the company has a centerless grinding attachment which equips the Space Saver for centerless polishing and grinding of stock up to 5" OD.

For companies with cylindrical grinders available, Hammond Machinery Builders, Inc., showed a backstand which can be added to a conventional cylindrical grinder to convert it for belt use. An air-ten-



Extreme accuracy is obtained with very narrow abrasive belts on this Hein die polisher from Hartford Special Machinery Co., which grinds and polishes contact surfaces of extrusion and draw dies with grit lines parallel to the line of draw.



This Kearsarge machine polishes strip and tube stock longitudinally, indexing abrasive roll stock to a variable number of work points, each of which is supported by a platen which oscillates in a direction parallel to the travel of the work.

sioned backstand with air pressure regulator valve selects the proper pressure. This gives uniform belt tension automatically, regardless of belt stretch. The setup on a Norton grinder at the show was grinding rubber rolls, but it can also be used for numerous metalworking applications, such as the OD grinding of bars, rolls, tubes, and cylindrical shapes.

Kearsarge Engineering Corporation had a machine there for continuous abrasive finishing of two sides of coiled stock. Similar units have been designed for finishing rounds and other shapes as well. The unique part of the machine is the way the rolls of abrasive at each of the four platen positions on each side of the stock advance so new portions of abrasive are presented to the workpiece. Each roll is supported by a pneumatically-operated platen which oscillates in a direction parallel to the travel of the work. This gives a smoother finish than centerless grinding and the constantly advancing abrasive belts help attain high quality uniform finishes. The spools of abrasive cloth are reusable, but the same portion of any one spool is never used twice on the stock until re-wound and re-inserted in the machine.

Contour polishing machines with automatic positioners, such as Divine Brothers Company's new equipment with Job-O-Matic worktables; a die polisher for round core extrusion and draw die finishing, built by Hartford Special Machinery Company; and many types and hardnesses of back-up wheels for the belts were also displayed at the Behr-Manning show.

MEMORY'S THE THING AT M&M

Integrated memory systems — the kind of automation that's sometimes overlooked by those who think of automation only in terms of million-dollar integrated lines and equally-expensive tape controls — were much in evidence at Motch & Merryweather's show in the company's new plant addition.

• A jig borer made by American Sip Corporation, for instance, has a magnetic drum memory system that records up to 40 positions. For repetitive work, the machine operator sets each position on the first piece and indicates those positions on the drum. During subsequent operations on similar workpieces, the magnetic drum (called an Automatic Repeating Device DIR) reads off and locates machine positions accurately and quickly while the operator supervises the whole operation and loads and unloads the machine.

• One Avey drilling machine displayed at the million-dollar show was equipped with a Micro-Positioner table which uses a steel tape — again, punched by the machine operator as he sets up for the first part — to automatically position the table for repetitive work.

• Oster Manufacturing Company displayed a No. 3 turret lathe, equipped with a Lynn Hydraulic Drive and a Programming Drum, which controls turret and cross-slide functions as well as collet chuck and spindle speed selection.

In all, 60 machines and accessories, built by 33 different manufacturers but available from Motch & Merryweather, were demonstrated under power at the show. Other crowd stealers included Danly Machine Specialties' new line of open back inclinable presses, particularly one 35-ton model equipped with a V & O Feed-O-Matic; Norton's fast new 6 x 18 S-3 hydraulic surface grinder, which does precision grinding at 125 sfpm and reduces surface damage on parts, particularly heat-sensitive steels, because of the fast table speed; and Gould & Eberhardt's new Cold Heat gear tooth induction hardener, which does the induction hardening under water, thus quenching immediately as the hardening takes place and cutting distortion caused by conventional quenching.

A new version of an established machine was the 18-C Blanchard vertical surface grinder displayed, which now sports a settling tank outside its base for cleaner coolant supply. Motch & Merryweather's own sawing equipment, milling and centering machines, and vertical drilling and boring machines were also demonstrated, along with other machines from Buffalo Forge Company, Cincinnati Bickford Division, Davenport Machine Company Tool, Giddings & Lewis Machine Tool Company, George Gorton Machine Company, Kaukauna Machine & Foundry Division of G & L, Moline Tool Company, Production Machine Company, Springfield Machine Tool Company, Torrington Company, and V & O Press Division. end

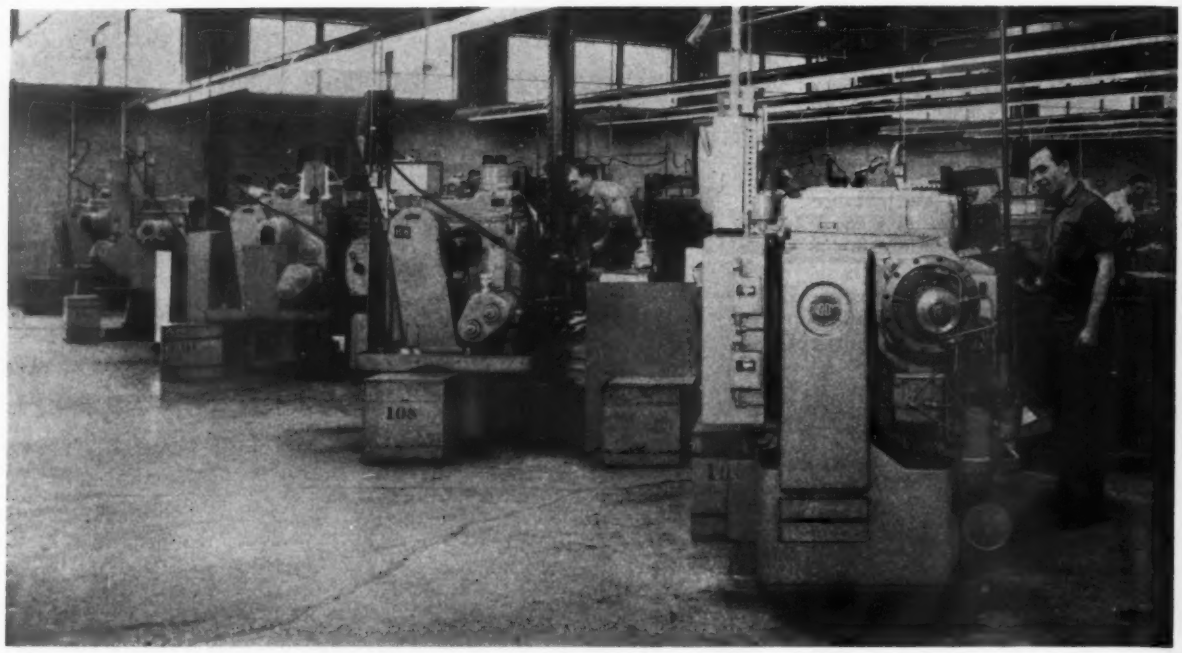


Fig. 1. In this machine shop of the Minneapolis-Honeywell Valve Division, Fort Washington, Pa., all of the machines are mounted on Unisorb vibration absorbing pads.

Machine Pads { Cut Costs / Eliminate Vibration / Improve Performance

A complete machinery mounting program instituted by the Minneapolis-Honeywell Regulator Co., Valve Division, at Fort Washington, Pa., has found the use of Unisorb pads in the installation of machines at its new plant there to be economical, efficient and helpful in the elimination of noise and vibration.

During a full year of experiments in the Division's old buildings in central Philadelphia, every type of noise and vibration dampener and various methods of installation were investigated. This resulted in a special mounting specification devised by Joseph Altmann, Plant Engineer, which called for the Unisorb pad as

Fig. 2. Unisorb pads cemented to floor and steel plate hold this 2-L Gisholt turret lathe firmly in place. Its 21" chuck frequently has to hold large and unsymmetrical workpieces at speeds up to 600 rpm. Due to the mounts, the jobs run vibration-free.

Fig. 3. This small bench grinder was installed quickly and easily, without bolts or lag screws, by cementing — legs to Unisorb pads, and pads to floor. Machine is securely and safely anchored in place.

the basic unit coupled with a ¾" steel plate for leveling and aligning adjustments. The steel plate was counter-sunk to hold captive the adjusting screws of the machines. The average cost per pad amounted to less than five dollars. This was considerably below the cost of other types of installations considered before the move; the others averaging approximately $22 to $25 per mount. Thus, the saving by using Unisorb pads on 107 machines was considerable.

The machinery mounting program was first devised to simplify the installation of the Division's 107 machines in the new building. The pads enabled riggers to speed the placing of the machines in their permanent position in the plant, and it is estimated that their use saved the division at least four man-hrs of work on the installation of each machine. That meant a minimum saving of 428 man-hrs on the total installation. This saving along with other economies in time, carefully planned before the move, enabled the division to be back at 92% operation in less than two weeks after the Central City Plant was closed down for the move. The dollars and cents savings were tremendous because of the speed with which the move was made and the little time the plant was non-productive.

The pads are used under every one of the 107 machines in the plant. The machines, except a few which present problems of critical balance, are not bolted or anchored to the floor in any manner.

The effectiveness of these specialized mounts is best illustrated, Altmann said, by a 2-L Gisholt turret lathe with a 21" indexing chuck which completely machines a three-inch valve body in one chucking. A large proportion of this weight is off-center on the chuck, creating considerable imbalance, particularly since it frequently is run at a speed of 600 rpm.

"I regard that machine as the acid test," Altmann said. "Anyone would expect it to walk all over the place without heavy anchorage. But it doesn't move whatsoever. Furthermore, you can put your hand on the machine and you won't feel any vibration at all. It has been able to maintain alignment comparable to that of a similar machine lagged to the floor."

The second important aspect of the Unisorb machinery mounting program was found in the reduction of noise and vibration and the improvement in machine performance. Visitors frequently comment at the comparative lack of noise in the new plant as well as the absence of vibration.

"The experience so far has shown that the alignment of the machines is consistently better," Altmann reported. "The machines stay in alignment much longer, although the type of floor in the new plant differs from the old and this may be partly responsible. It's too soon to tell whether the machines will last any longer, although the fact they are staying in alignment longer should indicate they will hold up better."

Another benefit is the fact that the machines are not rigidly installed. They can be moved to new locations with a minimum of effort. At times the company is compelled to relocate an entire production line. This means moving a large number of machines. Since they are not anchored to the floor, movement is made easier. At the same time, the movement of machines will not leave the floors at the old locations pock-marked by the holes left by conventional installations.

When installing Unisorb pads it is necessary to make sure the floor and legs of the machines are absolutely clean. A good scrubbing by varsal and detergent takes care of this effectively.

The nine months of use in the new plant have provided an excellent test of Unisorb pads and the management is more than satisfied.

end

THE SEPTUPLE — A NEW PRODUCTION COMBINATION

A new king-size production unit has been built that is adaptable for machining — from the rough castings to the finished part — seven different sizes of gear reduction housings. The housings cover a wide range of dimensions and weights.

The complete unit, built by Michigan Drill Head Co., consists of a three-station dial-type machine and an 11-station transfer machine, with tool boards for all of the tools and fixtures required to produce the seven sizes of housings. Seven-color coding distinguishes tools and fixtures to be used in machining each size of housings. Here's a play-by-play account of the operations:

Dial-indexing machine Station:

#1—Loading

#2—2-spindle, 50 hp milling head with 16" milling cutters, mills feet of castings in one pass.

#3—standard Michigan horizontal unit carries special 4-spindle drill head. Drills four mounting holes in feet.

Fig. 1. View showing largest and smallest of seven gear reducing housings being machined.
Weights: 85 to 800 lbs.
Bore sizes: 8.750" to 24.7505" dia.
Screw and dowel hole bolt circles: 10.125" to 26.000" dia.

Fig. 2. Front and R. H. aerial view of transfer machine showing loading, boring and feed out heads, cover drilling heads, and dowel boring heads.

Transfer machine

Set up in rectangular shape. Eleven stations arranged on two sides of rectangle with return conveyors forming the other two sides. Fixturing consists of master pallets with seven different size riser fixtures for each pallet. The riser fixtures keep the center bore on the same horizontal plane for each size part.

Stations:

#1—Loading

#2—Two standard HH-20 units, combined with 50 hp heavy duty boring and feed out units are used to perform the work at station #2. One inner and two outer bores are rough and finish machined, and the flanges are rough and finished faced and chamfered on the inner and outer diameters.

#3—All bolt holes, four dowel holes and one drain hole are drilled on each side of the housing.

#4 & #5—Precision spindles mounted on special Michigan HH5 units are used in boring the dowel holes. Unit has one flat and one Vee way, both hardened and ground. Each dowel must be in line with the dowel on the opposite side within 0.001" of the center bore. The spindles are mounted on right angle brackets in order to machine the dowel holes in two adjacent quadrents. The opposite dowel holes are bored at the same time.

#6—A six-spindle combination drilling and tapping head is mounted on a Michigan H5 vertical drilling column assembly for drilling the vertical filler, breather and drain holes at this station.

#7—Holes drilled in station #6 are tapped at station #7. Flange bolt holes are also tapped on a master lead screw bar-type unit.

#8—This station provides for tool set up, and for ease of maintenance.

#9—Machining arrangement similar to station #7. The horizontal breather, filler, and drain holes are drilled on each side.

#10—Holes drilled at station #9 are tapped at station #10.

#11—Michigan master lead screw bar type unit. Bolt holes in rear flange are tapped at this station.

As work at station #11 is completed, the pallet is automatically carried by conveyor to a blow-off station where the pallet and housing are cleaned of chips, then conveyed back to the loading station. Both dial and transfer machines are electrically controlled with Cypak panels. end

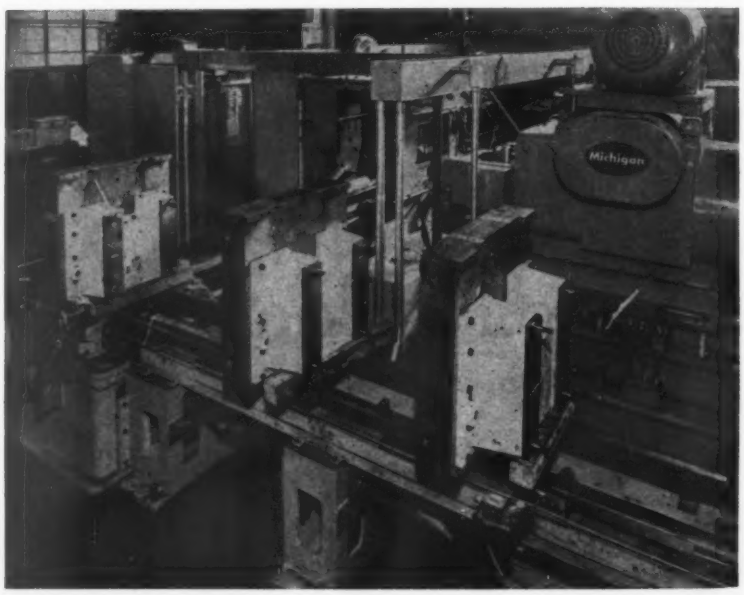
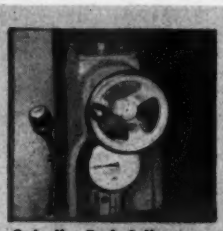


Fig. 3. Front and L. H. aerial view of transfer machine showing pallet return conveyor, pallet washout house, and Cypak control panel.

LOOK WHAT'S NEW

in Low-Cost Centerless Grinding

CINCINNATI FILMATIC No. 2 Centerless Grinding Machine equipped with the extra attachments illustrated here. Standard machine catalog No. G-644-4.



New Spindle End Adjustment Unit with dial indicator. For quick, accurate axial adjustment of grinding wheel spindle, when setting up for infeed grinding operations. ⅜" total adjustment available.

Automatic Grinding Wheel Balancing . . . an exclusive feature. Freely rotating steel balls automatically balance the wheel mount when unclamped. Perfect balance is attained in a few seconds. Ask for demonstration.

New Precision Indicator Attachment for taper correction. Provides a visual check on the amount of regulating wheel unit swivel adjustment, measured in increments of .000010" per inch. Top of unit shown here.

New Vari-Pitch Unit for hand infeed grinding. A simple change gear arrangement gives the operator a choice of three throat openings for maximum safety and convenience in loading infeed work.

. . . New Types of Equipment now available for CINCINNATI FILMATIC Nos. 2 and 3

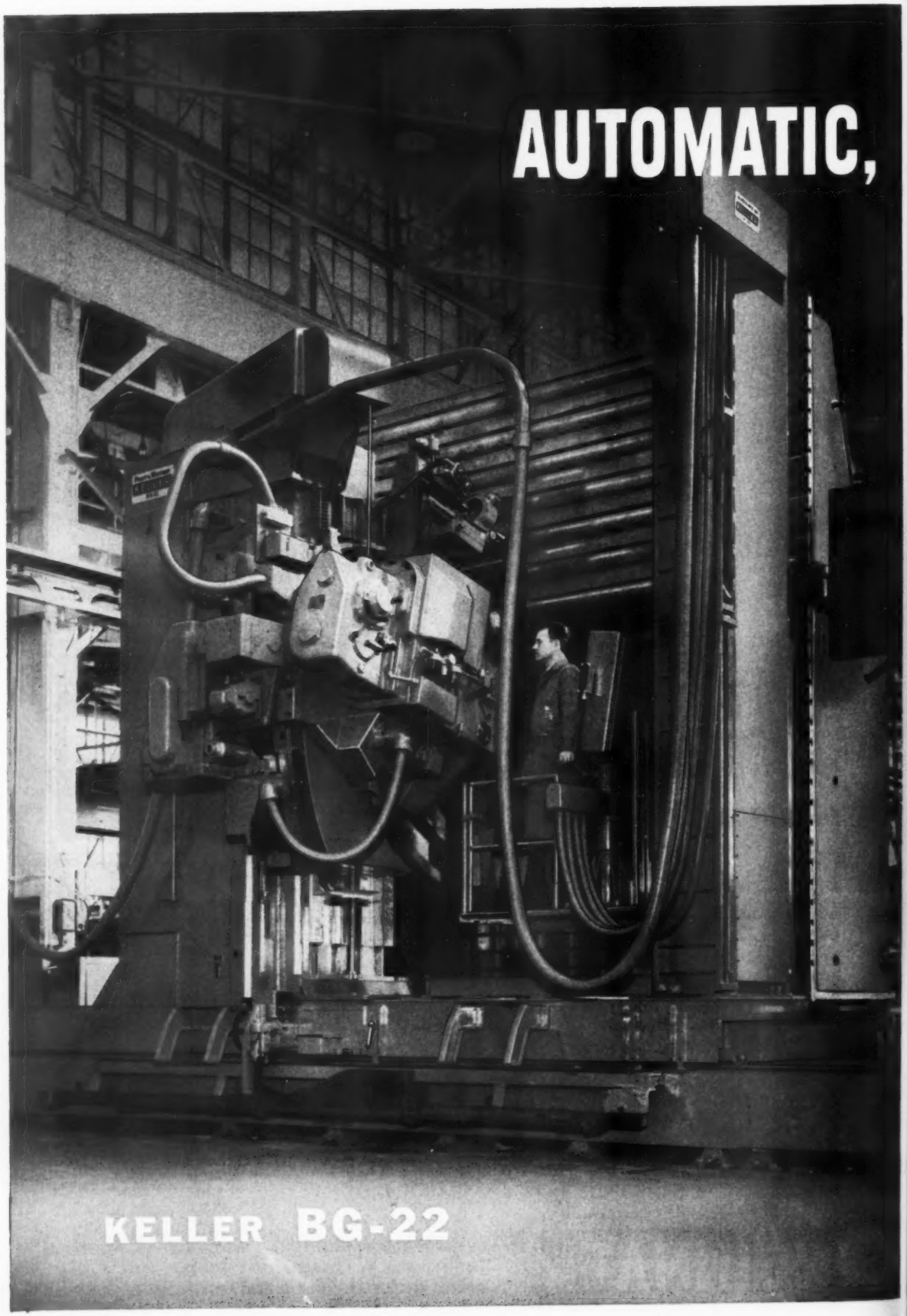
In addition to the many advantages offered by the new CINCINNATI Centerless Attachments and extra equipment illustrated here, the machine itself will give you far superior performance because of FILMATIC grinding wheel spindle bearings . . . anti-friction infeed slide . . . infinitely variable regulating wheel speeds . . . quality controlled castings. Cincinnati is tops for your replacement program; for producing your new products; for engineering service. Preliminary information in Sweet's Machine Tool File.

Grinding Machine Division
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

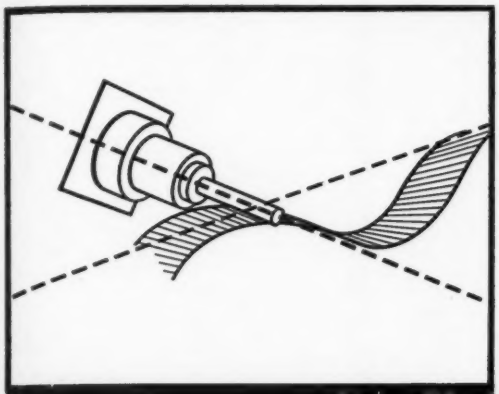
CINCINNATI®

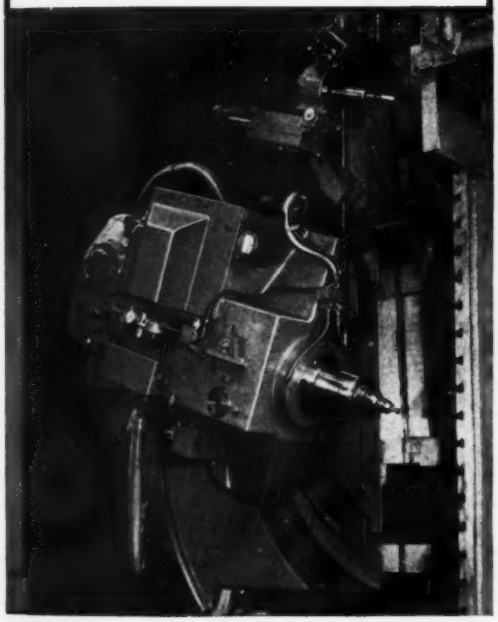
CENTERTYPE GRINDING MACHINES • MICRO-CENTRIC GRINDING MACHINES • CENTERLESS GRINDING MACHINES • ROLL GRINDING MACHINES • SURFACE GRINDING MACHINES • CHUCKING GRINDERS • CENTERLESS LAPPING MACHINES

CIRCLE INFORM-A-GRAM KEY NO. 53


AUTOMATIC,
KELLER BG-22

here's a NEW TWIST *in* TRACER-CONTROLLED MILLING





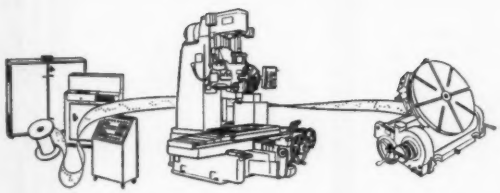
Pratt & Whitney Keller Automatic Tracer-Controlled Milling Machines have long been known throughout industry for their ability to produce complex, irregular 2- and 3-dimensional shapes. They bring outstanding speed, accuracy and economy to the manufacture of dies, molds, prototypes and production parts.

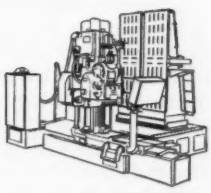
The special machine shown here — a modification of our giant Type BG-22 — adds a "new twist" to the already great versatility of these machines. This special machine can be operated as a standard Keller . . . profile-milling from a 2-dimensional template or duplicating a 3-dimensional full model. In addition, it is equipped with a specially designed milling head that has a range of tilt from 20° above to 20° below the horizontal. With the degree of tilt of the head and cutting tool controlled by a template, this machine will be used to generate "warped surfaces" by profile milling. This type of milling is frequently encountered in the production of aircraft structural components where the outer surfaces of the part must be accurately profiled and, at the same time, correctly twisted or "warped" to conform with the designed contours of the aircraft's surfaces. The development of this special Keller Machine makes it possible to produce these "warped surfaces" by the most direct, accurate and economical method.

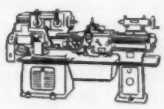
Your own operations may not involve the milling of "warped surfaces." But the example of this special machine demonstrates Pratt & Whitney's experience and engineering know-how in solving special production problems. And — whatever your requirements — for fast, low-cost milling of irregular shapes and complicated curves, there's a P&W Keller Machine just right for every work size with capacities ranging from 36" x 20" to 20 feet by 7 feet.

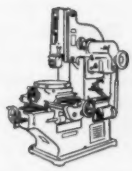
Write now for complete information . . .

PRATT & WHITNEY COMPANY, INC.,
15 Charter Oak Blvd., West Hartford, Connecticut









NUMERICAL CONTROL . . . JIG BORERS . . . ROTARY TABLES . . . KELLER MACHINES . . . LATHES . . . VERTICAL SHAPERS

PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

CIRCLE INFORM-A-GRAM KEY NO. 55

MEN YOU SHOULD KNOW

Feller Engineering Co. has elected **E. G. Klein** president. He succeeds **Karl Feller,** retired, who continues as a director of the company.

Clearing Machine Corp. announces that **Lew Murray** is manager of the Contract Dept., and **George C. Zenrz** is the Methods Dept. supervisor.

Ford Motor Co. announces these changes: **D. S. Harder,** to vice president and technical advisor to the chairman of the board and the president; **John Dykstra,** vice president—manufacturing staff, and continues as director of the Aircraft Engine Div'n; **C. H. Patterson,** vice president, head of the Power Train Group; and **Irving A. Duffy,** director of the Body Group.

Newly appointed chief engineer of the Gisholt Machine Co. is **Edward C. Helmke.**

Dr. Phillip W. Lett has become chief engineer and **Walter C. Beyer** assistant chief engineer of Defense Engineering at Chrysler Corp. Now serving in the newly-created position of chief engineer and director of Truck Product, Dodge Division, is **Stephen J. Tomkins,** and **George W. Gibson** is chief engineer and director of Car Product.

Cyril Bath Co. announces that **James Peterson** has joined the company as chief engineer.

Appointment of **Harold H. Gillespie** as general manager of the Split Ballbearing Division of Miniature Precision Bearings, Inc. has been announced.

Election of **N. M. Forsythe** as presi- of the National Automatic Tool Co., Inc. has been made known. Forsythe was formerly vice president and general manager. **Harry W. Bockhoff,** former president and chairman of the board, continues as chairman.

New vice president and general manager of Cincinnati Lathe and Tool Co. is **James A. D. Geier.**

Grant A. Morrison, former engineering administrator, has been named manager of product design and application engineering at the Metallurgical Products Department of General Electric Co. He will be responsible for design and application of carbide products.

The promotions of **J. L. Molner** to chief engineer, **H. C. Matlock** to administrative engineer, and **B. C. Butler** to general superintendent have been announced by The National Acme Co.

In a move to expand the responsibilities of its divisional executive officers, Pratt & Whitney Co. Inc., has announced that **Albert L. Knapp,** vice president and manager of the company's Machinery Division, and **Edward J. Shages,** vice president and manager of its Cutting Tool and Gage Divisions, will now head the sales activities of their respective operations.

Now serving as plant manager of the Colson Corporation's Jonesboro, Ark., plant is **A. James Crookes.**

J. Wesley Lee has been elected president and general manager, and **Robert C. Gould,** vice president, of The Challenge Machinery Co.

Appointment of **Edward A. Reynolds** as manager of quality control at A. M. Byers Co. has been made known.

Henry Wohlers has been appointed to the newly-created post of staff engineer for the Machine and Tools Division of Michigan Tool Co.

The following promotions have been announced by Gardner-Denver Co. **Robert Williams,** general plant advisor; **A. J. Kathmann,** works manager; **G. A. Schumacher,** manager of foundry operations; **E. J. Brown,** superintendent of LaGrange Foundry; and **James A. Van Doorn,** supervisor of maintenance divisions.

Carl E. Rowe has been appointed president of Milwaukee Valve Co.

New vice president in charge of manufacturing and engineering at Stran-Steel Corp., a unit of National Steel Corp., is **Hillery G. Knecht.**

Promotion of **Ross H. Begg, Jr.,** to assistant to the general manager at Pratt & Whitney Aircraft, has been announced by the company.

The Hufford Corp., a subsidiary of The Siegler Corp., announces the election of **Dan W. Burns** as president. Previously vice president and general manager, he succeeds **Merrill L. Bengtson,** chairman of the executive management committee of Siegler.

Robert E. Kemelhor is now manager of future product planning and development for both Pesco Products and Wooster Divisions of Borg-Warner Corp. He will direct supplementary product development programs to increase diversification at the divisions.

Michael Zajac is now serving in the newly-created position of vice president in charge of engineering at Buhr Machine Tool Co.

General manager of Plymouth Mfg. and Engineering, Burroughs Division, Burroughs Corp., is **DuRay E. Stromback.**

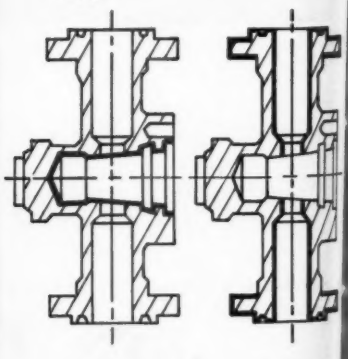
Let me show you*

**Bob Marr,*
P&J Representative
Houston, Texas
Telephone: MOhawk 7-3964

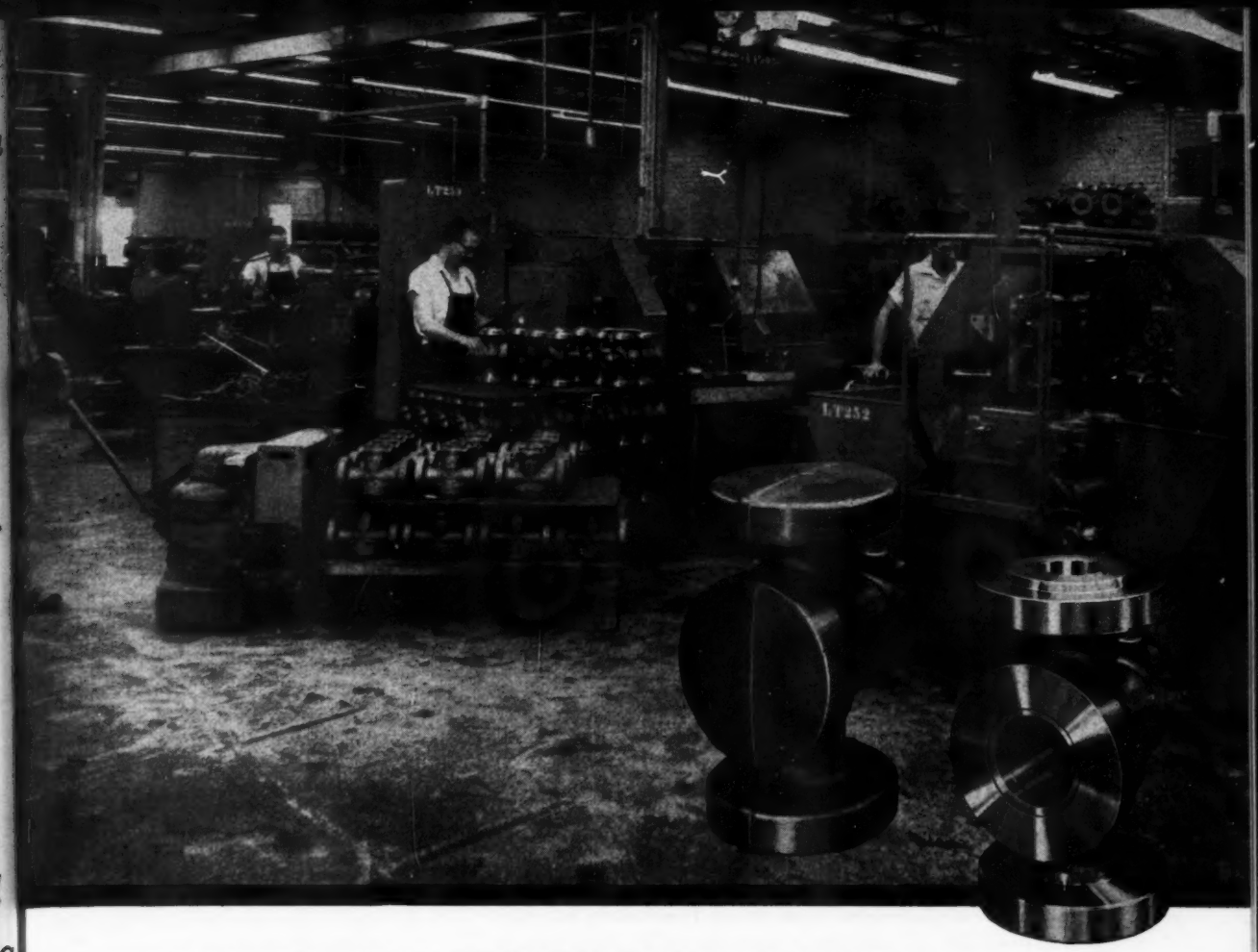
how two P&J Automatics helped Rockwell Manufacturing C

JOB FACTS:

PART: *Valve Body*
MATERIAL: *Steel Forging*
REQUIRED: *A series of 22 roughing and finishing cuts involving very heavy metal removal*
THE MACHINES: *2 P&J 4-U Automatic Turret Lathes*
THE RESULTS: *A part completed in only 3 fully automatic cycles... with machining time reduced 71%.*



FIRST OPERATION
SECOND OPERATION
BLACK AREAS INDICATE METAL REMOVED

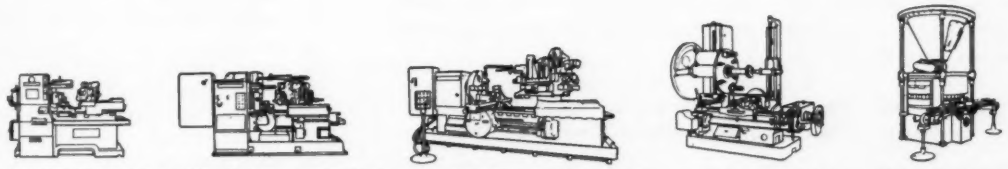


. . REDUCE MACHINE-HOURS 71%!

The Rockwell Manufacturing Company of Sulphur Springs, Texas, a leading producer of valves for petroleum and other industries, was using hand-type turret lathes to produce finished valve bodies from rough steel forgings. Looking for a way to reduce costs on this operation, Rockwell purchased two Potter & Johnston 4-U Automatic Turret Lathes. Machine-hours for this operation have been reduced 71% and man-hours have been reduced 86%. In addition, the hand machines and their operators have been released for other work they can handle more profitably, and overall plant production has been increased.

If the parts *you* manufacture require a series of complex cuts, a P&J Automatic can bring you important savings in time and money by producing these parts in a high-speed, fully automatic cycle. And you'll find that P&J Machines are recognized for their ability to take continuous heavy-duty operation in stride.

Act now. Ask the P&J Representative in your area to recommend a production plan for your specific needs. Or, if you prefer, write direct to Potter & Johnston Company, Pawtucket, Rhode Island.



AUTOMATIC TURRET LATHES . . . GEAR CUTTERS . . . PACKAGING MACHINES

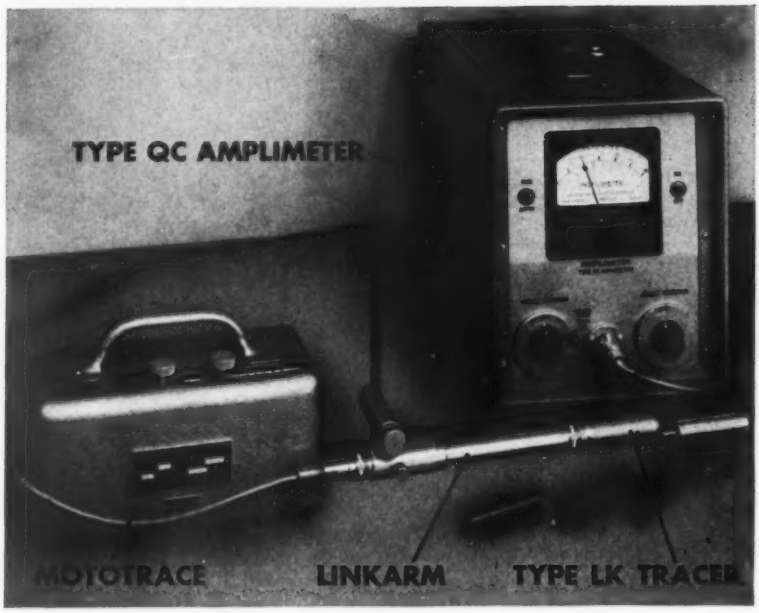
POTTER & JOHNSTON

SUBSIDIARY OF PRATT & WHITNEY COMPANY, INC.

PRECISION PRODUCTION TOOLING SINCE 1898

CIRCLE INFORM-A-GRAM KEY NO. 57

NEW! Profilometer® GROUP III



Measures Roughness of Surfaces from 1/8" to Flat — ID and OD

THIS shop equipment handles an exceptionally wide range of roughness measurement—with *proven Profilometer accuracy.* It is lightweight and portable — built for use by shop personnel — and includes the following items:

NEW Type LK Tracer — Measures on ID's and OD's as small as 1/8" — flats — tapers — narrow splines — gear teeth. Passes through a 3/4" hole.

NEW Type QC Amplimeter — Shows roughness from 0 to 1000 microinches (arithmetical or r.m.s.) on an easy-to-read meter. Has 3 standard roughness width cutoffs. Factory-calibrated for dependability.

Mototrace and Linkarm — Give the Tracer a steady support and smooth motion, essential to dependable measurement. No operator skill required.

FREE LITERATURE gives details. Write for it. And, without obligation, let us arrange for a demonstration in your plant. We have representatives in principal industrial centers throughout the Free World.

Remember: You can DEPEND on the PROFILOMETER — first in surface roughness measurement since 1936.

Profilometer is a registered trade-mark.

MMC® MICROMETRICAL MANUFACTURING COMPANY

339 S. MAIN ST. ANN ARBOR, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 58

SURVEY OF NEWER BRAZING METALS FOR HEAT RESISTANT ALLOYS

Newer types of brazing filler metals are getting a workout as higher service temperature requirements are imposed on brazed assemblies for rocket and jet parts, as well as other industrial products. Some of the promising filler metals for production brazing of heat-resistant alloys were outlined by A. M. Setapen, Handy & Harman's manager of engineering, at the past Midwest Welding Conference.

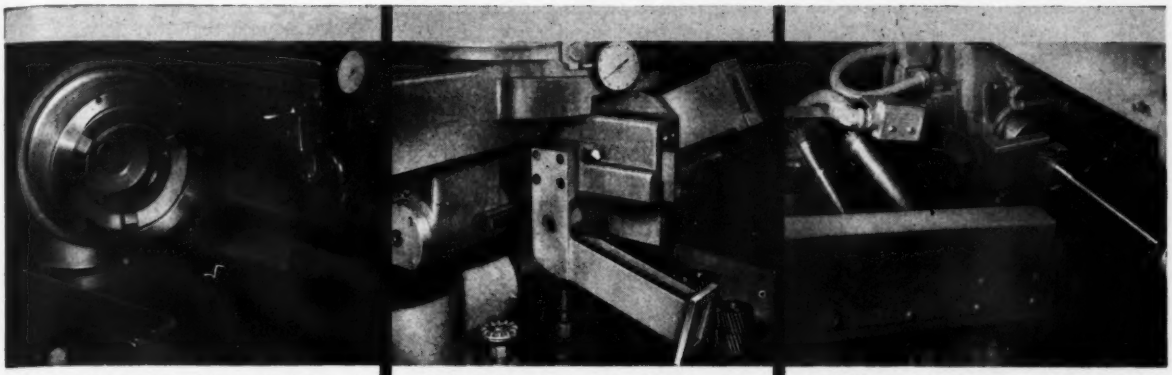
Research performed at the Armour Research Foundation, he said, shows that the addition of a small percentage of lithium markedly improved the fluidity and wetting ability of many standard alloys. Thanks to the lithium modification, it is now possible to braze stainless steel in an atmosphere, without flux, at temperatures as low as 1600°F.

One such filler metal — sterling silver with lithium — is rapidly gaining favor for brazing honeycomb panels made of 17-7-PH stainless, Setapen reported. Its flow temperature corresponds to the temperature for proper heat treatment of this metal, and the joints retain a tensile strength of 35,000-40,000 psi at 900°F (short-time test), the maximum service temperature for 17-7.

Because of its high fluidity, silver-copper-lithium filler is good for penetrating small gaps between the parts of the brazed sandwich, and represents a marked improvement over silver-manganese, which does not easily wet 17-7-PH steel. Joints of sterling-lithium alloy are more corrosion resistant than those of silver-manganese. It is reported that the use of this lithium alloy in place of silver-manganese has reduced the reject rate on brazed honeycomb sections from 45-50% down to less than 10%. The high fluidity of the alloy, however, has been found objectionable on large, curved surfaces because of excessive run-off of the molten alloy. If developments now under test are successful, says Setapen, the process of brazing honeycomb panels should be improved, and costs reduced to the extent that brazed honeycomb will become a standard high-strength, lightweight structural material.

Other fillers in which the addition of small amounts of lithium has proved advantageous are the silver-copper eutectic, ASM 4772, and silver-manganese. An alloy showing considerable promise for brazing

. . . *Continued on Page 60*



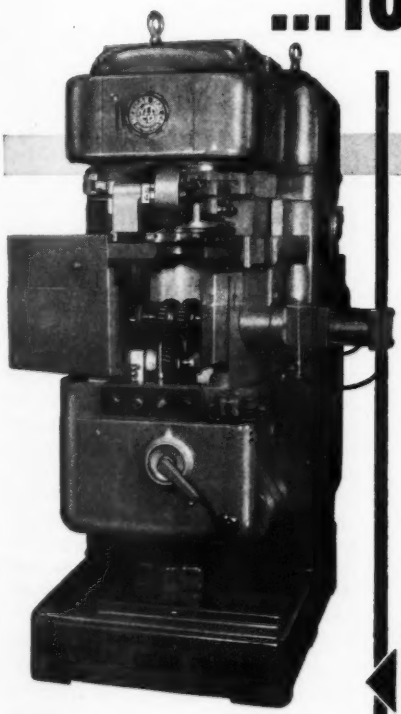
INTERNAL 870-C, only vertical internal shaver where a heavy mass (chuck and gear) drives the cutter. Reversals impose no abnormal loads on cutter teeth. This prevents excessive cutter breakage. Extras—plunge shaving.

UNDERPASS 870 Gear Finisher for fastest shaving—long or short run—of spur, helical, herringbone or shoulder gears. Extras—the new knee, new cutter-saving drive, crowning cutters, easy to set up and operate.

READILY AUTOMATED—Michigan 870 and 870-A shavers can be partly or fully automated. They are the only vertical shaving machines featuring 'straight-through' automation. They can be automated to load or unload from front or back.

TO GET BETTER GEARS AT LOWER COST

...look for the extras



UNIVERSAL 870-A (with new knee) permits adjustable automatic upfeed to be used with any of the three basic shaving methods. Extras—faster approach, longer tool life. Optional crown shaving attachment (permits shaving of a series of gears with varied crowns using only one tool).

Michigan's latest 870-series Gear Finishers are loaded with EXTRAS. A new knee assembly brings all controls to the front—and puts the operator closer to the work. Operators like ease of setup, vernier and dial locating, and the simple locking. Work located above cutter makes manual loading safer, automatic loading easier. Machine ways are up out of the way of contamination by chips or foreign matter. Timken bearings, extra-rugged fully splined shafts and a shock-absorbent drive, provide a sturdy no-backlash drive. Starts and stops are cushioned to keep cutters operating longer. Every installation has the EXTRA of being individually Michigan Application Engineered to cut costs.

Write for descriptive literature.

May we have the Michigan Tool engineering representative in your area show you how Michigan gear finishing can make your geared parts even better.

MICHIGAN TOOL Company

from blank to finished gear

7171 E. McNICHOLS RD., DETROIT 12, MICH., U.S.A.
IN CANADA: COLONIAL TOOL CO. LTD.

CIRCLE INFORM-A-GRAM KEY NO. 59

There's a Lot More to a Counterbore Than Just APPEARANCE!

If you have a big investment in discarded counterbores with bent or chuck-worn shanks, you are not specifying

SCHRILLO

Long-Life COUNTERBORES

Schrillo Counterbores are made from a single piece of high speed steel to provide the highest obtainable quality and longer wear.

The shanks are re-heat treated right in our own plant to give toughness, yet a hard surface is maintained to eliminate scoring due to repeated chucking and turning when in normal use. A hardened shank eliminates the all-too-frequent condition of bending that is common with soft shank counterbores. A counterbore that does not run true is subject to excess breakage of the cutting edges and, most important, spoilage of valuable work.

Pilot holes are lapped for accuracy. (2) Body and shank are both ground between centers for absolute concentricity. (3) A through knock-out hole permits quick removal of pilots. (4) Four flutes are standard to facilitate O.D. measurement and wear determination.

Aircraft-type Counterbores, designed for use in hand tools, are shorter, fit into a ¼" chuck. Aside from the chucking area, they have a heavy duty shank for greater strength and longer wear.

Counterbore Pilots may be used with either Regular or Aircraft-type Counterbores. Their exceptionally long life is the result of a very hard surface and tough core, perfect alignment, positive retention and absolute concentricity.

For Counterbores that *wear,* and WEAR, and WEAR always specify SCHRILLO!

SCHRILLO COUNTERBORES *are another in the great family of quality products made exclusively for the tooling and gaging industry — by* SCHRILLO.

Write today for Catalog No. 103D and name of dealer nearest you.

SCHRILLO

AERO TOOL ENGINEERING COMPANY

LOS ANGELES 46, CALIFORNIA

CIRCLE INFORM-A-GRAM KEY NO. 60

. . . Survey from page 58

titanium and its alloys is the silver-lithium binary, containing 2-3% lithium. Peel strength is not yet satisfactory for some applications, but work is under way to improve this.

Other heat resistant alloys mentioned by Setapen include the following:

Silver Palladium and silver-palladium-manganese, used to some extent in England, and of experimental interest here. Palladium additions to silver increase the melting temperature, strength, and ability to wet iron- and nickel-base alloys; manganese further improves the wetting. These alloys do not penetrate or dissolve the metal base to any extent. Their joints are less susceptible to crevice corrosion attack than those made with silver-manganese alloys; resistance to oxidation is like that of other silver-base alloys.

Manganese-Nickel is being used very successfully for joining stainless steel, Inconel, and other heat resistant alloys. At elevated temperature it retains much of its high joint strength and it offers better oxidation resistance than either silver-copper-lithium or silver-manganese. Its properties fall midway between the latter two fillers and the nickel-chromium-silicon-boron filler metals; it is better than the high-silver fillers in oxidation resistance, but not as good as the Ni-Cr-Si-B group. On the other hand, it has much less tendency to dissolve or penetrate the base metal than do the high-nickel alloys.

Nickel-Silicon-Boron and nickel-chromium-silicon-boron alloys contain nickel as the main constituent, with silicon and boron as the other alloying elements. In two of the alloys, part of the nickel is replaced with chromium to provide superior oxidation and corrosion resistance. In hardness and strength retention in the 1600-1800°F range, these materials are unsurpassed, Setapen believes. They do attack many base metals, however, by intergranular penetration and solution.

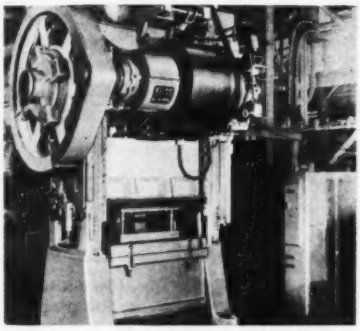
Gold Alloys are considered in situations where intergranular penetration of the base metal cannot be tolerated, and where high strength and excellent oxidation resistance are required at temperatures around 1600°F. The high gold content makes them expensive on a per-ounce basis, but in most cases the value of the assembly and the extreme importance of the reliable high-temperature performance outweigh, by far,

the cost of the small amount of alloy needed to make the joint.

Compared with the high-nickel alloys, the gold alloys have lower hardness, better ductility and can be produced in any variety of wrought forms. They also have excellent wetting and flow characteristics.

ELECTRONIC PRESS DRIVE UNIT IMPROVES SPEED AND CYCLING

A new completely electronic press drive, the Bliss Accutrol drive, makes it possible for presses to do things they have never done before. It permits reverse jogging of a press without stopping and reversing the motor, thus saving considerable time when setting large dies. Its design permits a rapid advance of the ram to the work, compensated automatic slow-down to prevent tearing blanks, and a fast return.



Accutrol is electronic power and control. It delivers, alternately, direct and alternating current to induction windings. Power is supplied through mercury-pool ignitions.

Normal clutching and braking are controlled by a servo system, reports E. W. Bliss Co., which electronically compensates for thermal and kinetic variations.

This press drive unit has a number of advantages over other forms of press driving: (1) it stores flywheel energy for instantaneous response to work loads, for fast acceleration and for reacceleration; (2) it has inductive interlocking with direct current to minimize slip and increase efficiency; large reserves of clutching torque make possible improved drive ratios with faster press speeds and cycling rates; (3) its reserve rotating alternating current field controls slowdown, load limiting, recuperative braking and reverse jogging; (4) its electronic switching eliminates motor generator sets and maintenance on large contactors.

new, revolutionary
ALINA
SELECT-O-POINT
drill grinders

Right hand twist drill, with centre
Twist drill for soft material, lips corrected
Three-flute drill core drill
Spot facing cutter, countersink angle 60°
Screw tap, grinding of the angle of rake

Designed for rapid and accurate grinding of:
Keyway Milling Cutters • End Mills
Spot Facing Cutters • Screw Taps
Twist Drills • Step Drills • Reamers, etc.

Three models to choose from — *No. 01-2 Range .004" thru .080"—No. 03-6 Range .012" thru .240"—No. 2-32 Range .093" thru 1.250".* Each machine is a complete system built around a *planned drill point.* Applied to twist drills, this new drill point will increase the useful life of your drills — reduce the drill thrust force — eliminate the need for center punching — produce a rounder and more accurate hole — and on the larger drills afford you a drill point that will produce a round and almost burr-free hole in sheet metal. Fully variable adjustments may be accomplished with a minimum of effort; settings once selected may be altered or repeated *exactly* at any time. Accuracy and simplicity is built into each machine.

WRITE FOR ILLUSTRATED LITERATURE.

ALINA CORPORATION
122 East Second Street, Mineola, Long Island, New York
Alina Corporation, 853 East 8 Mile Road, Detroit 20, Michigan
Jerico, Inc., 4744 West Lake Street, Chicago 34, Ill.
CIRCLE INFORM-A-GRAM KEY NO. 61

LONGER DIE LIFE, AUTOMATIC OPERATION

THE **Clearing Hi-Speed Press**

A Clearing Hi-Speed Press is the combination of ruggedness and speed that you've been looking for to run progressive and high speed blanking dies. The frame is beefed up with plenty of extra steel where it counts. Square gibbing with oil lubricated bronze ways hold the slide in lasting alignment. As a result, you can trust your most expensive dies to these machines, *and get more out of them.* Bed and slide are twice as rigid as a standard press—die life increases far beyond normal expectations.

These presses are ready to go when they reach your plant—all controls and automatic equipment are in place. Installation is simply a matter of connecting the air line and electricity.

A complete line of Clearing Hi-Speed Presses is available from 50 through 200 tons. Speeds to 300 SPM. Write for bulletin.

CLEARING PRESSES

the way to efficient mass production

CLEARING MACHINE CORPORATION *division of* **U.S. INDUSTRIES, INC.**

6499 W. 65th Street—Chicago 38, Illinois / Hamilton Division, Hamilton, Ohio

CIRCLE INFORM-A-GRAM KEY NO. 62

THREAD INSERTS REDUCE BROACH CUTTER FAILURES

Obtaining adequate life from broach cutters was a problem confronting the Detroit Aluminum & Brass Corporation, caused by the material around the threads in the hardened cutters pulling out as shown by the right-hand pair in Figure 1. When the threads "cratered" or a "plucking fracture" occurred, a pair of cutters worth $100 was scrapped. The failure might occur after one operation or up to 50% of the normal life of the cutter.

The problem was solved by installing wire thread inserts made by Heli-Coil Corporation, a Division of Topp Industries, Inc. (left-hand pair Fig. 1). The holes are drilled and tapped for a class 3 fit and the cutter then heat-treated. The inserts are turned into the tapped threads to a depth of two threads below the surface.

Fig. 1. Threads tapped in broaching cutter at right caused the metal around the top to pull out as shown. The life of the cutters was unpredictable from one pass up to 50% of normal. Wire thread inserts installed two threads below the surface solved the problem. All eight holes in the pair of cutters at left have been equipped with inserts. Life is limited only by thickness of the metal between the throat of the cutting blades and the bottom of the insert. A pair of cutters costs $100.

Cutter life is now limited only by the thickness of the metal remaining after continued sharpening. When the cutters have been sharpened to the point where the grind wheel hits the bottom of the inserts, the cutter is scrapped.

Several reasons are advanced for the success of the inserts. Formed of stainless steel wire, the inserts are flexible and distribute the screw load more evenly over all the threads in the parent material. There is little chance for the top threads, for example, to take all the load. By turning the inserts two threads below the surface, it is impossible for the top two threads to bear any load

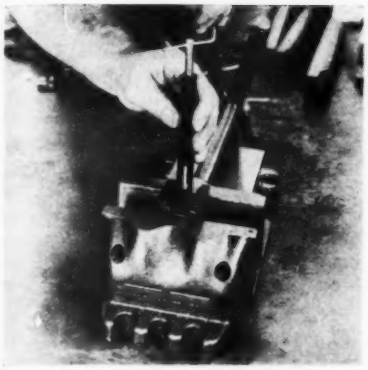


Fig. 2. Clamping cores of cyanide steel hold bearing caps in broach while cutters machine diameter. Thread failure of 1/4" or 5/16" thread was reducing life to 2-3 months. With inserts life is virtually unlimited.

at all. The top surface is possibly more brittle than lower layers in the cutter. The cap screws which secure the cutter to the ram of the machine put stress on the parent material below the surface, through the inserts, which is less brittle and less likely to break out.

Detroit Aluminum & Brass also uses inserts to repair damaged or stripped threads in the small clamping core holders which hold the bearing inserts in place while machining the split line (Fig. 2).

Die sumps, used for cutting blanks for bearings of steel, babbitt and other alloys, are also repaired with inserts. The cutting edges of the die are secured, with considerable torque, to the steel holder. The threads are often damaged and strip out (Fig. 3).

The company also repairs damaged threads in bolster plates on presses with inserts and uses them to strengthen threads originally in new jigs and fixtures made of aluminum.

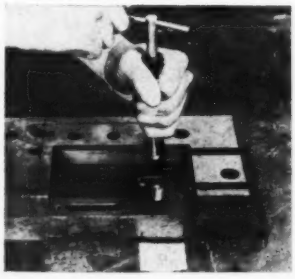
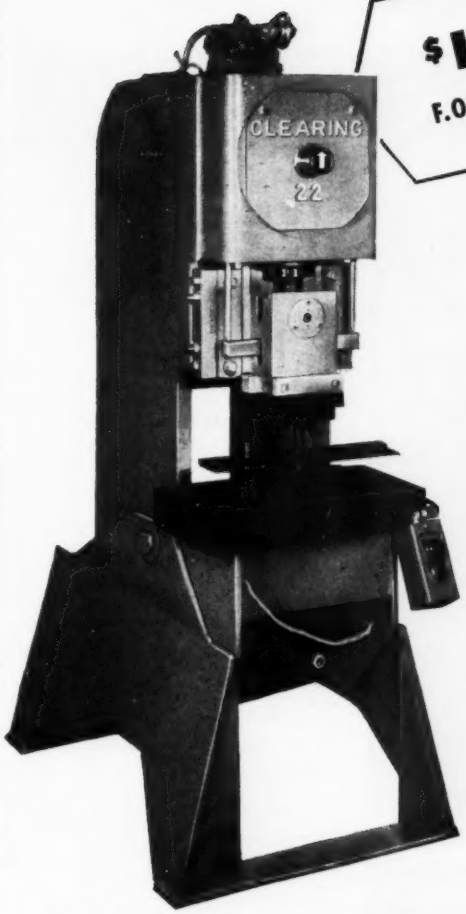


Fig. 3. Die sump is used to cut bearing blanks. Cutting edges are secured to metal holder by cap screws. Threads in holder often stripped out under torque or wear (see piece of thread on paper in front of holder). Thread repair with inserts is permanent and eliminates plugging the hole with oversized plug and relocating hole.



$1,395.00
F.O.B. HAMILTON, OHIO

the all time HIGH in a press BUY

This is the Clearing Torc-Pac 22—an all steel welded O.B.I. with deluxe features normally found in only the more expensive presses. Featuring an enclosed design, this geared press offers a choice of variable speed ranges and a top speed of 225 S.P.M.

AIR FRICTION CLUTCH AND BRAKE

The Torc-Pac 22 has an air-friction clutch and brake—a transmission unique in design and revolutionary in performance. The clutch and brake combination works in oil. It's designed so that normal wear which takes place in a conventional air friction clutch, just doesn't happen in the Torc-Pac. Sound impossible? Why not find out.

Look into the Clearing Torc-Pac 22.
More information is yours for the asking.

Also available in 32 & 45 ton capacities

CLEARING PRESSES

the way to efficient mass production

CLEARING MACHINE CORPORATION *division of* **U.S. INDUSTRIES, INC.**
6499 W. 65th Street—Chicago 38, Illinois / Hamilton Division, Hamilton, Ohio

CIRCLE INFORM-A-GRAM KEY NO. 63

consult the... Roto-Finish

CUSTOMER'S MAN

FOR

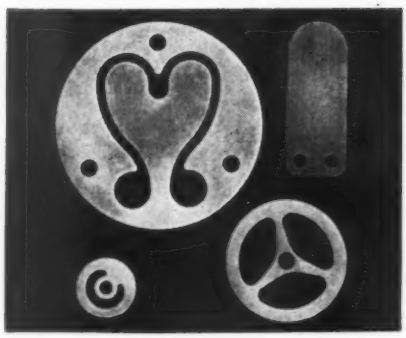
FINISHING PLUS+

RESEARCH AND TECHNICAL ASSISTANCE

Faced with the problem of cutting down finishing costs with no sacrifice in product quality, more and more production and management men are turning to Roto-Finish for complete finishing *service*.

In the Roto-Finish Laboratory, technicians analyze your problem to determine the process which provides the desired finish at minimum cost. Often, it is necessary *to develop a new compound* to meet a specific need.

Test runs are then made in the Roto-Finish Processing Department under production conditions. If desired, your local Roto-Finish Customer's Man will run these tests in your own plant; so that you can check the results at first hand, results like this...



Roto-Finish CASE HISTORY

PART: Refrigeration compressor flapper valves. • MATERIAL: Swedish steel. OPERATIONS PERFORMED: Deburr. Generate full radii on all edges. Remove stress risers. • RESULT: Fatigue resistance increased 500%.

ROTO FINISH®

Roto-Finish COMPANY

3729 MILHAM ROAD
KALAMAZOO, MICHIGAN
Phone: Fireside 3-5578

FOREIGN REPRESENTATIVES: ARGENTINA—Taller—Buenos Aires ● AUSTRALIA—A. Flavell Ltd.—Cheltenham ● BRAZIL—Commercial E. Industrial de Fornos Werco, Ltd.—Rio de Janeiro ● CANADA—Canadian Hanson & Van Winkle Co., Ltd.—Toronto ● ENGLAND—Roto-Finish Ltd.—Hemel Hempstead ● FRANCE—Societe Roto-Finish—Paris ● GERMANY, AUSTRIA, NORWAY, SWEDEN, SWITZERLAND—Metallgesellschaft A. G.—Frankfurt, a. M.—Germany ● HOLLAND, BELGIUM, LUXEMBURG—N. V. Roto Finish Maatschappij—Delft, Holland ● ITALY—Societa Roto-Finish a R. L.—Milan ● SPAIN—Instituto Electroquimico, S. A.—Barcelona

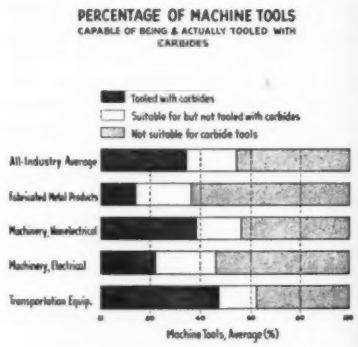
CIRCLE INFORM-A-GRAM KEY NO. 64

INDUSTRY'S TOOLING PRACTICES ARE NOT SO MODERN

If a manufacturing industry's progressiveness can be measured by the tools it uses, most U. S. metalworking industries have a lot of room for improvement, according to officials of the Wesson Company, large Detroit tool producer for whom a major survey of tooling practices has just been completed.

The survey unexpectedly reveals that Industry applied carbide cutting tools on only about one-third of its metal-cutting machine tools. Even more surprising is the fact that almost half of the machine tools used by Industry are not suitable for application of carbide tools.

Respondents in the transportation equipment industry, generally considered as being more carbide conscious than others, say they have carbides on only three out of every four machines on which they *could* use such tools. Just under half of all the machine tools used in the transportation equipment industry are tooled with carbides. At the other end of the scale, only about 15% of the machine tools used in the fabricated metal products industry are tooled with carbides although 36% could be so tooled.

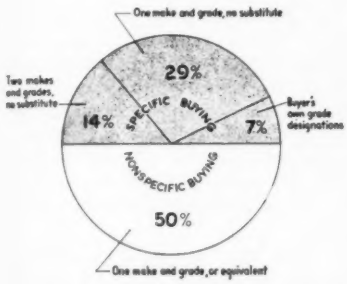


Survey data indicates the plant in the best competitive position has purchased machine tools on which carbides can be used effectively, and carbides *are* used on these machines. The typical progressive company has large annual purchases of carbide tools, almost regardless of the *number* of production workers it employs. Chances are good that this company will be specific as to the carbide to be used on tools it buys. One (or more) make and grade of carbide is specified *without* substitutes.

Most popular method of specifying carbides is by "one make and grade *or equivalent*." Used in 60% of the

companies surveyed, this method of specifying is deceivingly easy. The specifier, in theory, need know only one grade of carbide that will "do" the job. Final responsibility for obtaining that carbide or its "equivalent" rests with purchasing and final selection is based on price and delivery. When purchasing can show savings over the specified carbide and can arrange uninterrupted delivery, then substitutions that they consider equivalent will be made.

CARBIDE SPECIFYING METHODS
HOW THEY ARE USED BY METALWORKING INDUSTRIES



Unfortunately, production activities fail to provide data to guide in determining the equivalency of different makes and grade of carbides for *particular operations*. This information must be obtained from carbide salesmen or from the so-called Manufacturers Interchangeable Grade Designation Chart. Carbide purchases based on such information may or may not do the required metalcutting job. In 45% of the companies surveyed, a grade number from the Grade Designation Chart is used as the primary specification at least part of the time. Such specifications produce the same results as the more popular "one make and grade or equivalent."

The fallacy of the method is shown by the reasons given for use of these two non-specific buying methods:

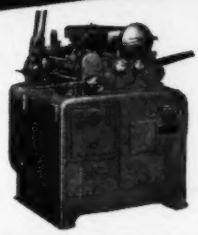
1. There is not much difference between "equivalent" grades; or

2. All makes are pretty much alike in performance.

Most popular of the specific buying methods is that of naming "one make and grade with *no* substitute." This method is used at times by 48% of the companies surveyed. With this method, production and purchasing nail down selection. Chief reason given for use of this specifying method is "Tests show no other grade can do as well." It is obvious that few companies who use this method predominantly are large, because larger companies do not care to be restricted to one source.

. . . *Continued on next page*

LITTELL
FEEDING-STRAIGHTENING MACHINES



HYDRAULIC RACK AND PINION FEEDING-STRAIGHTENERS, No. 4 HRP Series. 5-roll straightener and hydraulic drive for extra smooth, accurate feeding. Built in three sizes for stock up to .125" thick and maximum widths of 12", 18" and 24" respectively. Standard 19" feed length can be double cycled up to 38". Easily moved about to give "detachable automation" to your presses.

SINGLE RACK AND PINION FEEDING-STRAIGHTENERS, No. 4 Series machines with 3 to 1 Variable Speed Drive have 7-roll straightener and handle stock up to .062" thick. Built in 3 sizes for maximum stock widths of 24", 30" and 38". Feed 38" per cycle with normal feeding speed of 35 strokes per minute.

No. 6 Series machines have 5-straightener rolls, all power driven through a 3 to 1 Reeves Variable Speed Transmission. 4 sizes of these machines handle stock widths up to 36", 48", 60" and 78" respectively and feed up to 72" lengths per cycle. Quick Change Gears, block lubrication and air operated roll release available on all models, standard on most.

AUTOMATE

THE PRESS FROM ANY ANGLE

By a single electrical connection, the straightening-feeding cycle of these self-powered Littell machines is synchronized with the stamping cycle of your press. They feed the press or shear accurately from any direction, right to left or front to back. They can be positioned at odd angles to produce odd-shaped parts. They handle a wide range of stock widths and thicknesses. They can be disconnected from your press at will. The smaller machines are easily moved from press to press by fork truck, or temporarily set aside if a job is to be hand fed. Full details on these flexible press feeding machines is available in catalog sections "B".

DELIVERY IS GOOD

From the *larger* Littell plant, equipped to speed production.

LOOK TO LITTELL FOR ROLL FEEDS • SHEETING LINES
STRAIGHTENING AND FEEDING MACHINES
REELS AND CRADLES FOR COIL STOCK

SEE OUR CATALOG IN SWEET'S

USE THIS COUPON TO GET FREE CATALOGS.

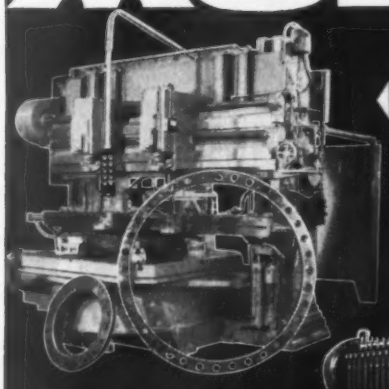
F. J. Littell Machine Co., 4197 Ravenswood, Chicago 13, Ill.
Send Littell Straightener Catalogs "B"

NAME _____
COMPANY _____
STREET _____
CITY ZONE STATE FM

F. J. LITTELL MACHINE CO.
4197 N. Ravenswood Ave.
Chicago 13, Illinois
District Offices: Detroit, Cleveland

CIRCLE INFORM-A-GRAM KEY NO. 65

MOLINE



HD68 drills bolt circles from 12" to 100" diameter. Each of the two spindles has capacity for 2½" drill in steel. Operating cycle is fully automatic.

HD13 straight line-type drilling machine with capacity for thirty ¾" drills in steel. Used for work on heavy castings, round and rectangular steel tubes, structural shapes, plates and grader blade drilling or countersinking.

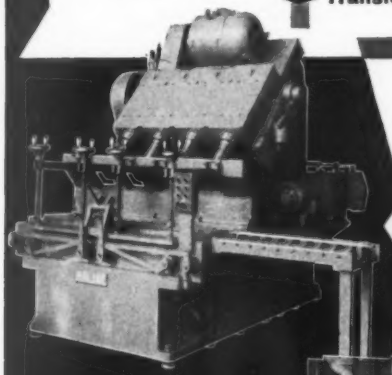
For Greater

PRODUCTION . . . EFFICIENCY . . . SAVINGS

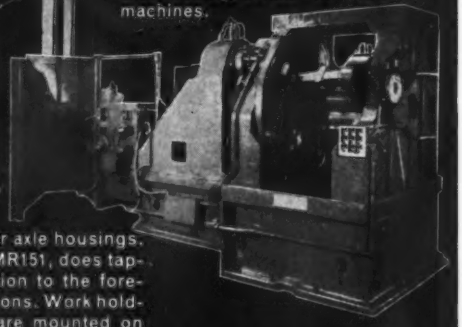
Use an individually designed "Hole-Hog" Machine Tool for such jobs as...

- Multi-Spindle Boring
- Single and Multi-Spindle Honing
- Straight Line Multi-Drilling
- Adjustable Spindle Drilling
- Vertical and Way-Type Fixed Center Drilling, Boring and Tapping
- Transfer-Type and Special Machines

OVER 57 YEARS OF MACHINE TOOL ENGINEERING EXPERIENCE IS AT YOUR SERVICE. TELL US YOUR PARTICULAR PROBLEM



13CB hydraulic feed cylinder boring machine. V-8 engine blocks are rough and finish bored for wet-type cylinder sleeves. Units of this kind are applicable for transfer machines.



MR152 performs drilling, reaming, spot facing and chamfering operations on tractor rear axle housings. A companion machine, MR151, does tapping in addition to the foregoing operations. Work holding fixtures are mounted on power driven trunnion.

MOLINE TOOL CO. HOLE-HOG MOLINE, ILLINOIS

MOLINE TOOL COMPANY

REPRESENTATIVES IN PRINCIPAL CITIES

109 100 20TH STREET · MOLINE, ILLINOIS

CIRCLE INFORM-A-GRAM KEY NO. 66

The fourth method of specifying is also specific but gives the company all the advantages of more than a single source. Specifications are written for "two (or more) specific makes and grades with **no** substitute." This method is used by 23% of the companies at least part of the time. Chief reasons given for use of this specifying method include:

1. Surest way to get best grade for job;
2. Ties down quality required; and
3. Gives leeway on price but avoids "lowest price" as *only* criterion in selection.

For this method to be a success, carbide specifiers must be well informed so they can indicate — operation by operation — more than one make and grade of carbide that will do the job well. Where an adequate test program is in force, this method apparently leads to the best over-all purchasing and production results.

Varied use of these specifying methods is confusing. There are no industry-wide patterns. There are no patterns by size of company. There are no patterns on the basis of volume of carbide tools bought. One positive statement that can be made is that (a) companies do not tend to set up their own "grade designations" and (b) most of the people who use them are not too happy with them. Certainly, also, companies that select specific makes and grades are happier with results than those who buy on an "equivalent" basis.

About 40% of the companies test different makes of carbides and slightly less test different grades of carbides. This is hardly consistent with the popular method of specifying "one make and grade or equivalent." It is true, however, that companies that use a lot of carbide tools are more likely to run tests.

On the manner of specifying makes and grades on *new* operations, again, the picture is one of inconsistency. "Past experience on similar jobs" is listed by 71% of the companies, "carbide manufacturer's recommendations" by 30%, "trying different grades before freezing specs" by 21%, "Interchangeable Grade Chart" by 18% and "tool vendor's recommendation" by 8%. These practices follow no pattern by industry, company size, tool purchases, or specifying methods.

On the whole, the picture is not as good as generally thought. Many people who use carbides are so close to the confusion they may not recognize it, Wesson officials believe. end

eliminate "cut and try" with Microbore...

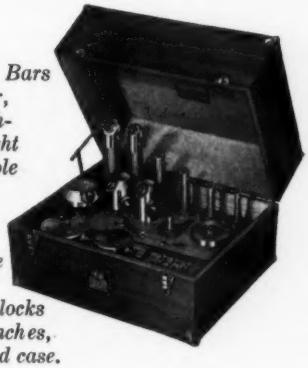
...THE TOOL THAT ADJUSTS PRECISELY IN SECONDS!

YES, EVERY TIME—ALL THE TIME! In seconds, with our proven micrometer vernier adjustment, any operator who can read a "mike" can adjust a Microbore Tool for precision boring to extremely close tolerances.

Any production man knows what that means. Elimination of wasteful down time. Greater productivity of men and machines. Fewer rejects. Better parts due to holding closer tolerances.

It just makes good sense to *Modernize with Microbore.* A few dollars so invested can increase the productivity of a machine costing thousands.

Microbore units can also be applied in clusters for special tooling designed for high production applications.



A wide range of Microbore Boring Bars with NMTB taper, Morse taper, Flash-Change and Straight Shanks are available singly or in complete sets. Standard set includes Microbore units for each tool station, grinding blocks and necessary wrenches, in a fitted hardwood case.

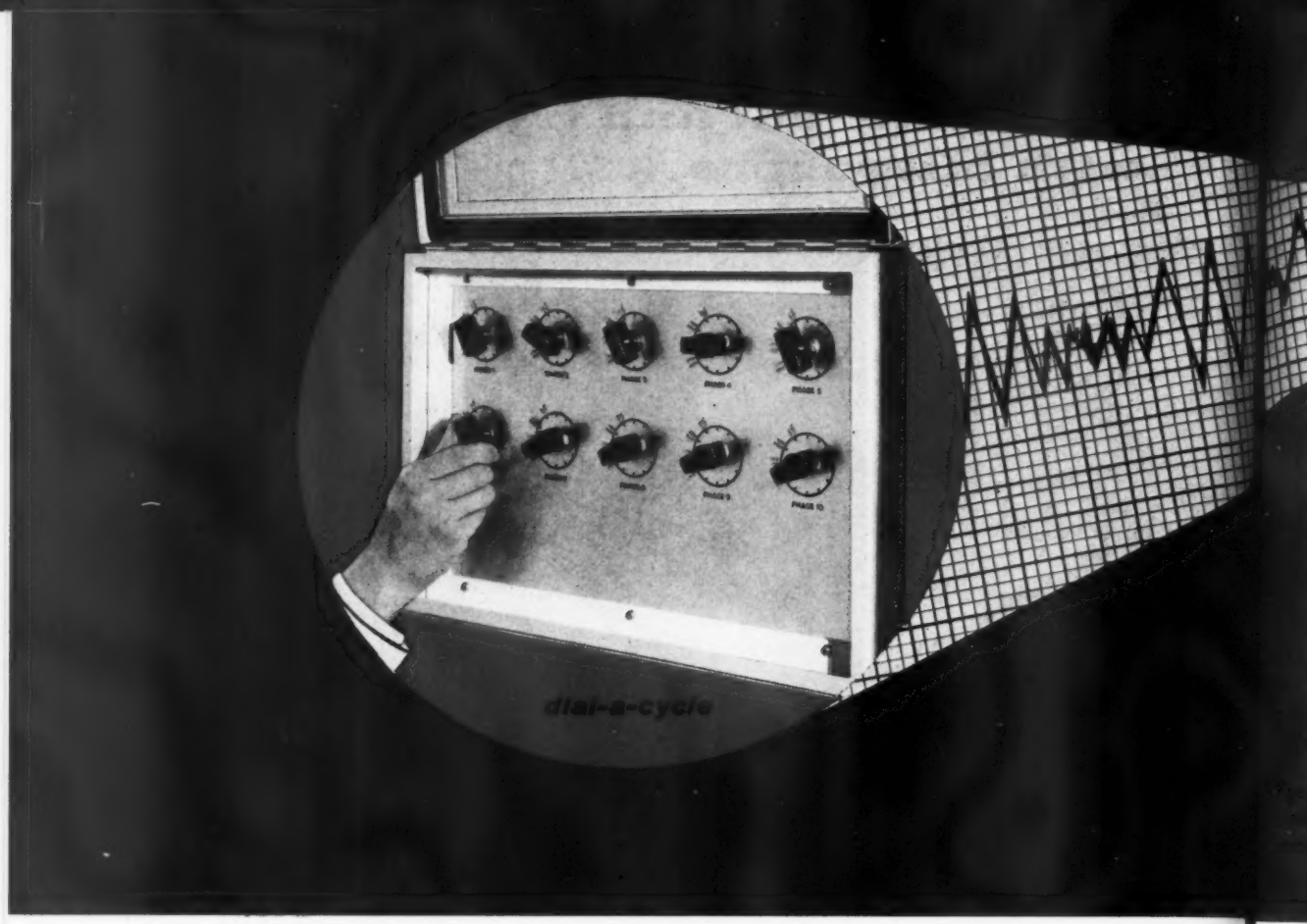
As the first step in eliminating your own costly "cut and try" methods, write for Microbore Catalog No. 56.

DeVlieg Microbore System

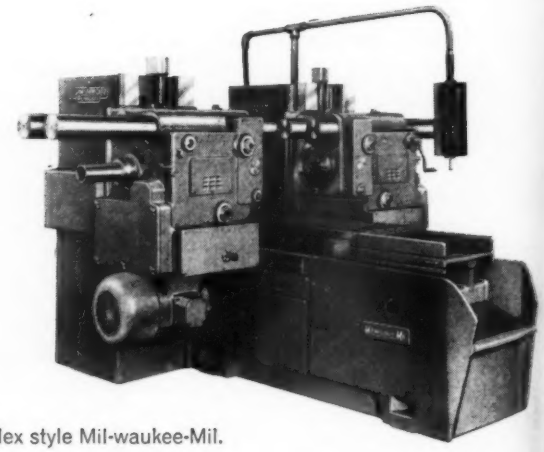
DE VLIEG MICROBORE • DIVISION OF DE VLIEG MACHINE COMPANY

2720 West Fourteen Mile Rd., Royal Oak, Michigan

CIRCLE INFORM-A-GRAM KEY NO. 67



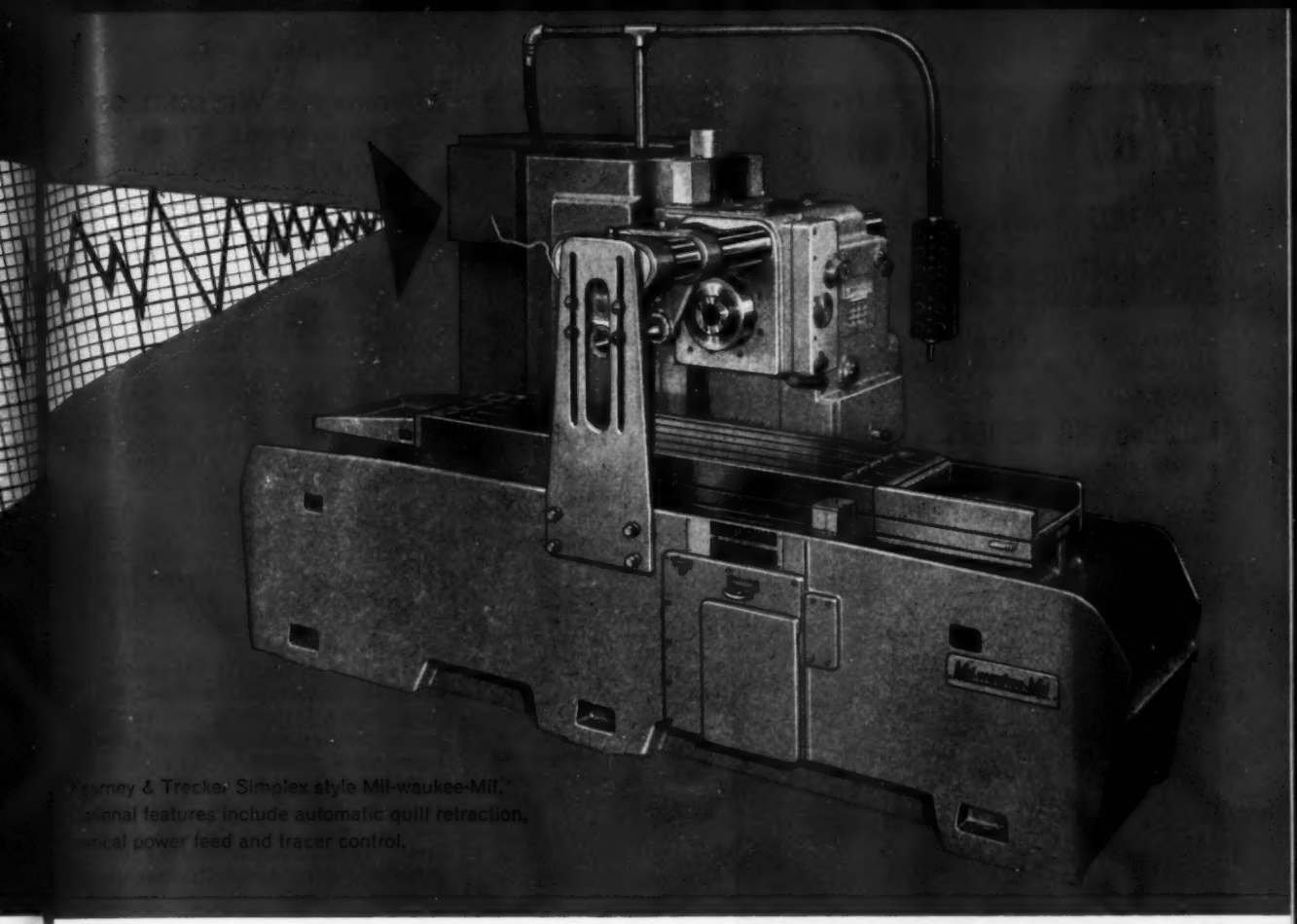
*first **dial** your results from the blueprint ..*



Kearney & Trecker Duplex style Mil-waukee-Mil.

KEARNEY & TRECKER
MILWAUKEE
®

Designers and Builders of Precision and Production Machine Tools Since 1898



Kearney & Trecker Simplex style Mil-waukee-Mil. Optional features include automatic quill retraction, vertical power feed and tracer control.

...*then get programmed production* ***automatically***
with the NEW ***Kearney & Trecker***

Mil-waukee-Mil® BED TYPE
PRODUCTION MILLING MACHINE

- ***dial-a-cycle*** **panel programs and controls each and every machine function . . . automatically!**
- **Interrupt or resume cycles at any time without returning to "start" position!**
- **Change from *dial-a-cycle* automatic control to manual with the flip of a switch!**
- **Choose from 72 standard models . . . Simplex and Duplex . . . 7½ to 30 hp.**

Fast, pre-phased setups slash idle cutter time — dramatically boost finished workpiece production. Do it on this remarkable new Kearney & Trecker Mil-waukee-Mil programmed production milling machine.

Operator simply dial-programs machine function into the ***dial-a-cycle*** control panel. No guesswork! He merely reads workpiece blueprint and establishes machining sequence with successive phase-switch dials.

Free Bulletin MM-58 —

Kearney & Trecker Corp., 6776 West National Ave., Milwaukee 14, Wisconsin.

CIRCLE INFORM-A-GRAM KEY NO. 69

Why MICROHONING AT EVINRUDE trims costs . . . booms productivity . . . eliminates operations...improves quality

Evinrude Motors, Division of Outboard Marine Corporation, has replaced with Microhoning their former method of processing conn bores. Here's why:

MICROHONING INCREASES PRODUCTIVE CAPACITY 23 TIMES

Before Microhoning equipment was installed, Evinrude used diamond boring on wristpin and crankpin bores. Now! A per-man productivity comparison of the two processes shows: diamond boring, 300 rods in 40 hours; *Microhoning, 7,000 rods in 40 hours.*

Shown to the left is one of two lines of Microhoners. Each machine has: Microdial automatic stone-feed and stone-wear compensation; automatic stone-wear indicator; and Microsize Gage Ring automatic sizing control.

REDUCES OPERATIONS

Greatest cost-cutting contribution made by Microhoning is *elimination of three former operations:*

1. Re-milling locating faces of wristpin bores.
2. Straightening of rods after boring.
3. Milling oil hole grooves in wristpin bores.

ELIMINATES BRONZE INSERTS

The functional surface characteristics of Microhoned rod bores preclude the need for bronze bushings or shoes. Based on current production schedules, *the cost of millions of bronze inserts will be saved this year.*

ASSURES FEWER REJECTS

From a Microhoning run of 62,000, receiving 100% inspection on an air gage, only 200 rods required reprocessing. *This is a rejection rate of only 3/10 of 1%.*

IMPROVES PRODUCT QUALITY

Microhoning is a low-velocity abrading process that leaves bore surfaces free of torn, smeared or burned metal. Benefit: *Rods that have precise, longer wearing bores.*

To learn more of why Microhoning provides efficient stock removal, closer tolerances and functional surfaces, write to:

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 70

AUTOMATED WELDING OF STRUCTURAL STEEL REDUCES COSTS 50%

Converting a job that ordinarily is manually performed to an automated operation was recently accomplished by the manufacturing engineers at Baker Perkins, Inc.

The problem was to construct from structural steel four sides of a battery of huge press frames, each of which alone weighs around 27 tons.

The work involved the welding of four 12" x 31' long ship plates, or channels, and four 12" x 31' I-beams to two back-to-back 2" plates 53" wide. As shown in Figure 1, two ship channels are placed on the outside and two I-beams are positioned on the inside on each 2" plate prior to welding. The 2" plates with their assemblies tacked on are then placed back-to-back.

By hand welding, it would take about 40 min/pass of 31' for each ⅜" fillet weld. Distortion, due to the intense heat necessarily applied, also presented a problem.

To shorten production time, and at the same time provide deep penetrating welds, while keeping costs down, an automated welding machine was developed. The machine includes an in-plant made cradle type positioner, a submerged arc welding head mounted on a rail, and some well placed shims to prestress the long steel structural members.

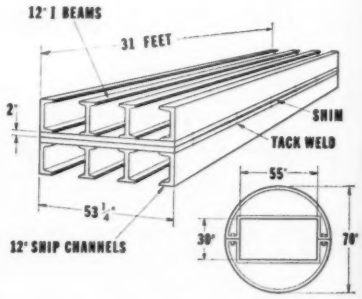


Fig. 1. Sketches indicate how ship plates and I-beams are positioned on back to back 2" steel plates for welding, and size of cut-outs of the 70" "wheel" type positioner for cradling the work. Use of spacers enable cradles to handle work of narrower widths.

The positioning units consist of two cradles to support each end of the structural steel. Each of the cradle ends is made in two halves, so that when they are fitted together a complete "wheel" measuring 70" in dia is formed (Fig. 1).

Cut-outs in each of the cradle halves are large enough to handle the largest beam to be welded. The cradles are arranged to roll on rub-

ber covered rolls, one set of which is power driven at variable speeds.

The submerged arc welding setup was made from a spare head, mounted on special wheels to roll on a beam type track (Fig. 2). The welding head is arranged so that it travels on the track in one direction, pulling a flux recovery unit behind it like a caboose. Power for welding is supplied by two 500-amp welders.

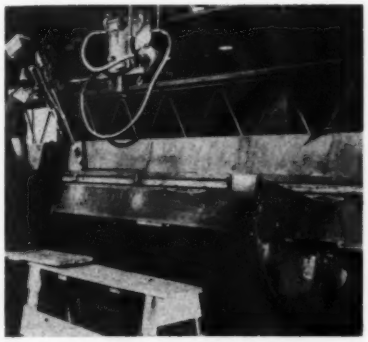


Fig. 2. View here shows three elements which enable Baker Perkins to use submerged arc welding in completing assemblies for a 27-ton press. Riding on track above is the submerged arc welding head with flux recovery unit trailing. At lower right is one end of the cradle positioner riding on rubber-covered wheels. Note how backing plates are separated with shim, center.

Prior to tack welding a series of clips on the sides of the backing plates, a shim in the form of a ½" x 2" bar is inserted between the back-to-back plates. This prestresses the work in the direction opposite from the direction of warpage. The shim size was determined on the first job from the amount of warpage that took place from the heat of welding.

The positioner is then rolled so that the submerged arc welding unit, when it goes into operation, is positioned to make perfect down-hand welds. Once this is done, it begins its travel along the track. Depending on the joint, the welder makes use of either 3/16" or ¼" wire, feeding it into the prepared joint. The unit welds at 18 ipm and takes about 20 min to complete a weld. This is a reduction of better than 50% in welding and handling time over hand welding.

Normally, for this type of job, only ⅜" fillet welds are made, and only one pass is required for each 31' groove along the edges of the ship plates and I-beams. However, when box type beams are welded, V-grooves are involved, requiring as many as 12 passes to complete a single weld.

. . . *Continued on page 73*

How MICROHONING AT EVINRUDE trims costs . . . booms productivity . . . eliminates operations . . . improves quality

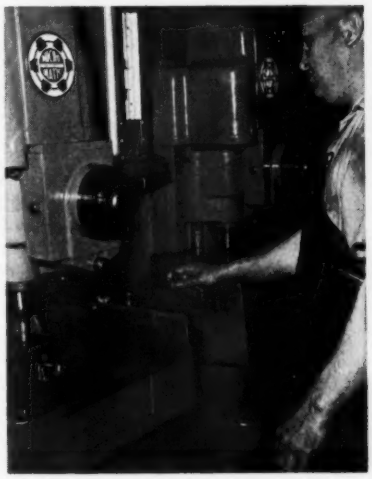
By installing Microhoning equipment to process wristpin and crankpin bores in conn rods, Evinrude Motors, Division of Outboard Marine Corporation, realized considerable savings. The following comparison with previously used diamond boring shows how Microhoning cut time, materials and costs:

MICROHONING BOOSTS PRODUCTIVE CAPACITY 23 TIMES

Diamond Boring Production Per Man: 300 rods in 40 hours.

Microhoning Production Per Man: 7,000 rods in 40 hours.

Several rod sizes are Microhoned on the same equipment — bore diameters range from .874" to 1.500", bore lengths from .815" to 1.011". Microhoning removes .005" stock from wristpin bores in about 24 seconds (floor-to-floor) and generates a controlled finish of 25 to 30 microinches as specified. On crankpin bores, Microhoning removes .0005" stock to generate specified finish of 3-5 microinches in 17 seconds (F-T-F). Tolerances on both bores are held to .0001" for roundness and straightness, and .0004" on diameter.



Close-up of double unit Microhoner shows operator checking a wristpin bore on air gage. Microdial, which automatically compensates for abrasive wear, is shown in center of photo.

ELIMINATES THREE OPERATIONS

1. Former re-milling of locating face on wristpin bore is eliminated — *Microhoning's float principle maintains original bore location.*

2. Straightening after rough boring is no longer required — *Microhoning tool follows neutral axis of bore.*

3. Milling oil hole grooves in wristpin bores is eliminated — *Microhoning generates a cross-hatch pattern that provides built-in oil reservoirs.*

SAVES COST OF MILLIONS OF BRONZE INSERTS PER YEAR

Microhoning's low-velocity abrading, with efficient cutting over a wide area, produces surfaces free of torn, smeared or burned metal.

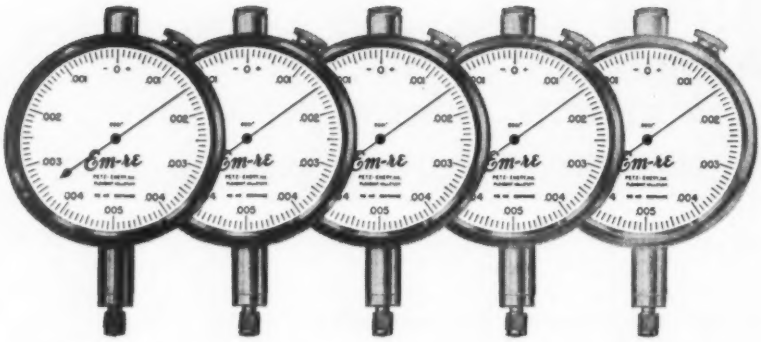
Result: Precise bores having surfaces that resist galling and flaking.

Benefit: User obtains longer wearing rod bores and a functional supplanting of bronze inserts.

For further information on Microhoning process or to receive movie "Progress in Precision", write to:

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 71



Dial Indicator Repeatability

The repeatability of "Em-re" Dial Indicators may not be quite as consistent as a photograph—but it comes mighty close! How close? . . . Well, "Em-re" Indicators will repeat consistently to an accuracy of 1/5 a graduation. On a .0001" indicator that's a repeated accuracy of .00002" (twenty millionths).

You need dial indicator performance like this to measure today's increasingly closer tolerances. With an "Em-re" you *can* measure to these closer limits—accurately and dependably. And "Em-re" accuracy permits an operator to use practically *all* of his allowed working tolerance. "Em-re" Dial Indicators are fully jeweled and completely shockproof throughout the entire range. They are now available in all four A.G.D. (American Gage Design) sizes, with 10 ranges from .002" to 1.000" and graduations in .001", .0005", .00025", .0001" and .00005".

Write For New Catalog E

Patented

PETZ-EMERY INC.
PLEASANT VALLEY, NEW YORK

CIRCLE INFORM-A-GRAM KEY NO. 721

1500° IN 5 MINUTES

2300° IN 30 MINUTES

johnson

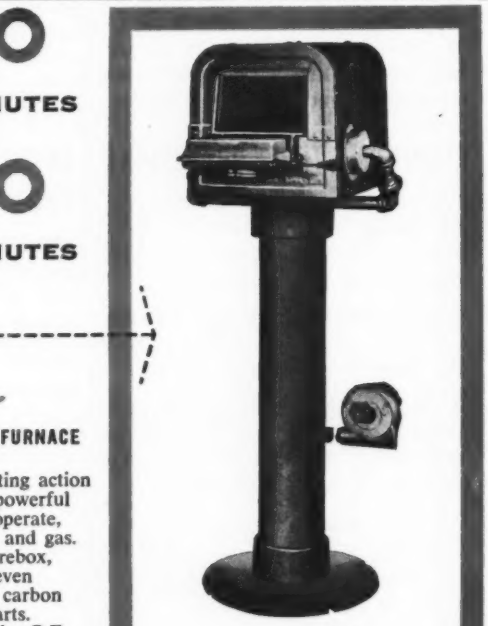
NUMBER 120 HI-SPEED FURNACE

That's the kind of quick heating action you get with this compact, powerful furnace. It's economical to operate, too. Fast heat-up saves time and gas. High-temperature insulated firebox, 5" by 7¾" by 13½", gives even hardening of high speed and carbon steel dies, tools and small parts. Temperature easily regulated. G.E. motor and Johnson Blower included. 120,000 BTUs per hour.

Pedestal style, F.O.B. Factory $184.00
No. 120 also available in bench style.

Write today for free Johnson Catalog

Johnson Gas Appliance Company
575 E Avenue NW, Cedar Rapids, Iowa



johnson
If it burns gas look to Johnson
Since 1901

CIRCLE INFORM-A-GRAM KEY NO. 722

for as little as $22.00 COMPLETE IN U.S.A

Get This Production Boosting

"TRICO-MIST" COOLANT SYSTEM

With Flexible Armored Coolant Lines And Kwik-Change Nozzle.

For drilling, tapping, milling, sawing, grinding, etc. Removes heat from cutting edges of tools and work. Feeds can be increased considerably, finer finishes and accuracy are obtained. TRICO-MIST absorbs heat, thereby quenching it faster than flood coolants which only transfer it. Chips slide freely up the tool face and are blown away automatically. Simple needle valve controls size and volume of mist spray. Attaches to shop air line. Available with one and five gallon containers — single or multiple outlets — single or dual valve control.

SEND FOR BUL. No. 37

TRICO FUSE MFG. CO.
MILWAUKEE, WIS. U.S.A.

CIRCLE INFORM-A-GRAM KEY NO. 723

NO BREAKAGE

PRODUCTO UNIVERSAL HAND TAPPER

For accurate hole-tapping without tap breakage, this Hand Tapping Machine is a "must" for every tool and die shop and toolroom. You can tap holes at any point in work within area of machine table. Quick-change spindles hold taps. Ready for instant use. Write for Bulletin TE4-182.

The Producto Machine Co.
970 Housatonic Avenue
Bridgeport 1, Connecticut

CIRCLE INFORM-A-GRAM KEY NO. 724

. . . Welding from page 71

When welding is completed on the top assembly, the top halves of each of the cradles is placed on the halves supporting the structural members. These are then fastened together with bolting flanges, then rolled 180°. The former bottom halves of the cradles are now on top. They are removed and submerged arc welding is resumed.

Fig. 3. Close-up shows the submerged arc welding head laying ⅜" fillet weld at 18" ipm along the back side of a 31' ship plate.

Interesting feature of the cradle ends is that they not only can be rolled over, but also can be spaced any distance to support practically any length work.

After final welding, the assemblies are stress relieved in a large furnace at 1150°F, and allowed to cool slowly. The clips, as well as the shims, are then removed from the back-to-back assemblies which end up with a minimum of distortion. The structural members are then sand-blasted to remove scale, and given a primer coat of paint, prior to being machined.

FILMS TO SEE

Hazards encountered in tubing installations and how to avoid them are illustrated in a 20-min color movie, which demonstrates the correct way of handling tube cutting, flaring, and bending operations. Write to The Imperial Brass Mfg. Co., 6300 W. Howard St., Chicago 31, for more information.

"Forging in Closed Dies" explains each kind of forging process, the design and making of dies, the variety of metals used, and their selection. The 16mm, 27-min film is available from Modern Talking Picture Service, Inc., 3 E. 54th St., New York 22.

Welding .008" diameter wire to a part the size of a fly's wing —3-D micro-vision makes precision possible.

Part to be welded shows up sharply under 13X magnification.

45X magnification and measuring reticle let inspector check winding tap-off gap to .5° (.001"). Potentiometer shown below, actual size . . . tap-off leads at top.

Why ACE ELECTRONICS calls B&L Stereomicroscopes "INDISPENSABLE for sub-miniature assembly"

Mounting a triangle this size to a shaft head this size with screws this size is just one phase of sub-miniature potentiometer production in the Somerville, Mass., plant of Ace Electronics Associates, Inc. Finished product is only ½" in diameter, ½" long, yet conforms to electrical characteristics of units four times its size. Precision specifications hold work to tolerances of .001". That's why Ace uses over 100 B&L Stereomicroscopes—for magnified, distortion-free views in natural 3-D aspect—in every stage of manufacture from assembly to measurement to inspection.

BAUSCH & LOMB

SEE FOR YOURSELF! FREE 15-DAY TRIAL!

BAUSCH & LOMB OPTICAL CO.
77332 St. Paul St., Rochester 2, N. Y.

☐ I'd like to borrow a B&L Stereomicroscope for 15-day trial without cost or obligation.
☐ Schedule an obligation-free demonstration.
☐ Send me B&L 3-D Micro-Vision Book (Cat. D-15).

NAME.....
TITLE.....
COMPANY.....
ADDRESS.....

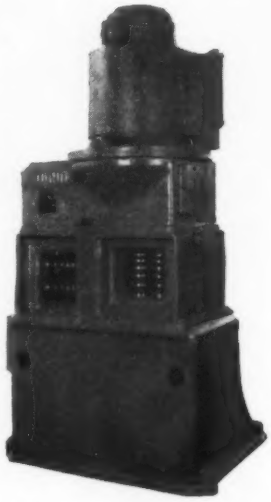
CIRCLE INFORM-A-GRAM KEY NO. 73

STEEL *from Wheelock, Lovejoy* BULLETIN

W-L CHICAGO Now in an ideal position to supply HY-TEN "M" Temper in large forged flats up to 6 x 22", rounds to 18" and squares to 17½". Also "B" No. 3-X in large forged flats to 6 x 13", rounds to 18" and squares to 16". Alloy forgings a specialty.

W-L DETROIT The new, larger warehouse and office here have greatly speeded up delivery on our orders and services in this area. Have a good stock of A-8620 on hand as well as all HY-TEN grades.

W-L CLEVELAND The rolls for this Vaughn Four-Roll Continuous Pointer are fabricated from HY-TEN "M" Temper, nickel-chromium-molybdenum oil hardening steel. This Pointer, largest of its type in the world, can point rods ranging from ½" to 1¼" dia. HY-TEN "M" was selected by the machine manufacturer because it can be quenched and tempered to high hardness levels while retaining considerably greater toughness than would be possible with most other steels.



W-L CINCINNATI Another new and larger warehouse recently opened here. Same-day service on all sizes, shapes and grades of HY-TEN, plus our usual help on metallurgical problems.

W-L HILLSIDE, N. J. This W-L warehouse has an excellent stock of HY-TEN "B" No. 3-X in rounds, flats and squares. Same-day delivery is promised. Many of the larger sizes of forged rounds are rough turned.

W-L CAMBRIDGE HY-TEN "B" No. 2 is still a great favorite in New England for parts requiring medium duty and high quality at a reasonable price. Our research and development assure better HY-TEN specials — "the standard alloy steels of tomorrow."

W-L BUFFALO New HY-TEN "B" No. 3X-40 now available here in rounds ½" to 8¼" and hexagons 1¼" to 2¾", heat treated to 300 Brinell. Machines as easily as heat-treated 4140 leaded, but less expensive. Suitable for flame or induction hardening — tough and shock resistant.

Write our Cambridge office today for your *free* Wheelock, Lovejoy Data Sheets. They'll give you complete technical information on grades, applications, physical properties, tests, heat treating, etc.

WHEELOCK, LOVEJOY & COMPANY, INC.
AMERICAN STEEL WAREHOUSE ASS'N
135 Sidney Street, Cambridge 39, Mass.

AGENTS: Southern Engineering Company, Charlotte, N. C.; Sanderson-Newbould, Ltd., Montreal & Toronto

CIRCLE INFORM-A-GRAM KEY NO. 74

PROGRAMMING FEATURES MACHINE TO PRODUCE DIFFERENT PARTS

Automatically controlled machines combining the advantages of multiple operations in automatic in-line sequence (as in transfer machines) with ability to switch rapidly from producing one part to another of entirely different dimensions and shape, are now being used in the plant of a manufacturer of road building equipment.

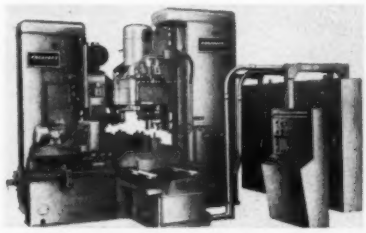


Fig. 1. Overall view of the machine as seen from the operator's position. This "Economatic," built by Buhr Machine Tool Co., combines automated processing with maximum versatility. "Building-block" units (two vertical heads and one horizontal) are tooled for production of several parts.

This machine (Fig. 1), built by Buhr Machine Tool Company, currently is programmed for producing any one of six different parts (four are shown in Fig. 2). The sequence cycles of from six to eight operations on the different parts are controlled simply by turning a selector switch to the position corresponding to that part. In effect, it is the process rather than the machine that is automated.

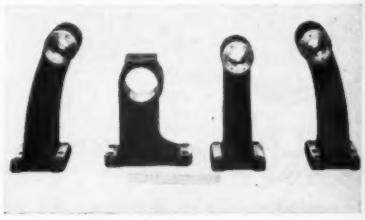


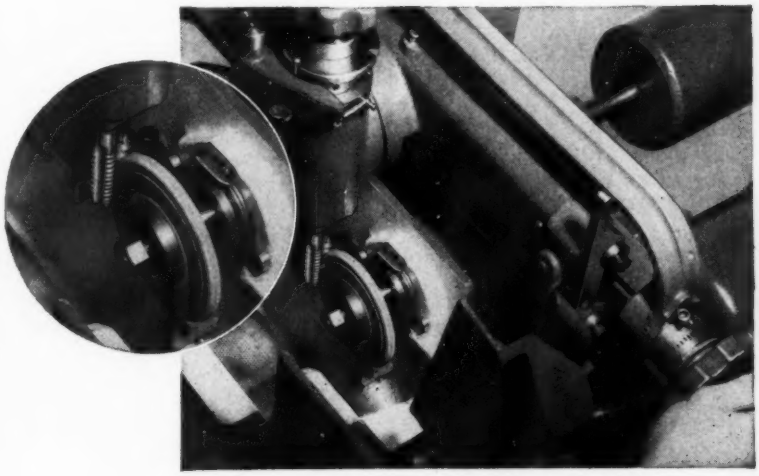
Fig. 2. These typical parts, carrier-roller supports for earth-moving equipment, are all made on the same automated machine. Fixturing (clamps and locating blocks), head movement control dogs, and the selector switch position have to be changed for each part run.

The machine eliminates the necessity of costly and complex electronic equipment for programming. Further increasing the flexibility of the machine application is its use of "building-block" components. It can be readily converted to the production of other parts when the need arises.

. . . *Continued on page 76*

NOW – You can control rake or hook angle and insure accurate indexing of cutting edges* of taps with the BLAKE FLUTE GRINDER.

**Just as necessary on taps as on milling cutters.*



Keep it sharp — Make 1 tap do the work of 6 with The Blake Flute Grinder.

This accuracy will result in uniformity of hole, much longer life for your taps and a surprising savings in tap costs.

Write for bulletins on BLAKE Tap Sharpening Machines

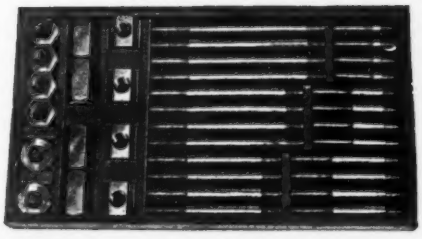
EDWARD **BLAKE** COMPANY INC.
MANUFACTURERS OF FLUTE AND CHAMFER GRINDERS
442 CHERRY ST., WEST NEWTON 65, MASS.

Exclusive Distributors of:
Black Diamond Drill Grinders • Surface Finish Standards • Worcester Drill Grinders.

CIRCLE INFORM-A-GRAM KEY NO. 751

REID Tool Room NEEDS

HANDY SET-UP STUD SETS



Available in 12 different sets in wide range of sizes. Each set contains 24 studs, 4 each of T-Nuts, Coupling Nuts, Hexagon Nuts and Washers. Each item also obtainable separately.

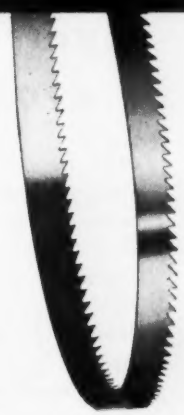
FREE — 74 page catalog listing scores of needed items for tool room. Address

REID TOOL SUPPLY COMPANY
MUSKEGON HEIGHTS, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 752

TECHNITE®
high speed steel band saw blades

- Faster speeds and feeds mean lower cost per cut
- High Speed steel stays hard, sharp and accurate
- Narrow kerf reduces waste, gives more pieces from stock
- Cuts stainless, high alloys, aircraft metals
- Available in regular or Shark Tooth



See Your Capewell Distributor

CAPEWELL

THE CAPEWELL MFG. CO.
HARTFORD 2, CONN.

CIRCLE INFORM-A-GRAM KEY NO. 753

SYNTRON

LAPPING MACHINES

- precision flatness
- metallographic finishes
- in production quantities

Save time in the lab, speed production in the plant

In the laboratory or in the plant, a single SYNTRON Vibratory Lapping Machine — or a battery of them — provides a fatigue-reducing, time-saving means of lapping and/or polishing metal surfaces for metallographic examination or for mating purposes.

In the lab, the technician is freed for more important tasks while the Lapping Machines do the hard work.

In the plant, one operator (to load and unload the machines) can produce more than several workers, lapping or polishing parts by hand. And results are better, more uniform. Improve product quality, increase production — with SYNTRON Vibratory Lapping Machines.

Our lapping department is also equipped to lap and/or polish parts in quantity on a contract basis should your production require too few parts to warrant the purchase of a SYNTRON Lapping Machine.

Write for complete information on SYNTRON Lapping Machines and SYNTRON'S custom lapping service.

MW1358

Equipment of Proven Dependable Quality

Syntron can help you with problems involving . . .

Vibrators (bins, hoppers, chutes)	Rectifiers (Silicon and Selenium)
Vibratory Feeders	a-c to d-c Selenium Rectifier Units
Vibratory Screens	Electric Heating Panels
Shaker Conveyors	Electric Heating Elements
Vibratory Elevator Feeders	Sinuated Wires
Weigh Feeders	Shaft Seals
Packers and Jolters	Electric Hammers
Hopper Feeders	Concrete Vibrators
Lapping Machines	Paper Joggers

Syntron Sales and engineering service is available from 36 representatives throughout the United States. Take advantage of their willingness to work with you.

For more information write for complete catalog . . . Free

SYNTRON COMPANY
341 Lexington Avenue Homer City, Pa.

CIRCLE INFORM-A-GRAM KEY NO. 76

. . . Features from page 74

Complete change-over from one part to another requires only changing of tools and work-holding fixtures, and resetting positive feed stops on heads if required.

Operations performed by the machine include milling, boring, hollow milling, facing, drilling, and chamfering. The parts are six different carrier-roller supports used in the track mechanism of crawler-type vehicles. A workpiece is manually loaded and clamped in a fixture, which is carried on a pallet. The pallet is quickly shuttled to the required station farthest from the load-unload position. In equal or unequal indexes, the workpiece is brought back through the work stations, stopping only at those where a machining operation is to be done on that part.

The single pallet is automatically positioned at each work station by one of four shot-bolts engaging a specific hole in a rail fastened to the under side of the pallet.

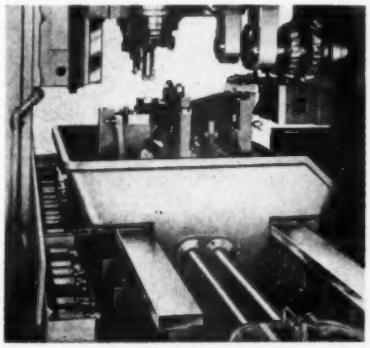


Fig. 3. Precision limit switches, at the left, are selectively energized by the selector switch so that the pallet is correctly cycled to and positioned at work stations.

Pallet position is controlled by a series of 20 precision limit switches (Fig. 3) that are acted upon by adjustable dogs located on the pallet. Cycles of the pallet and the heads are controlled by the selection of limit switches to interlock all machine operations.

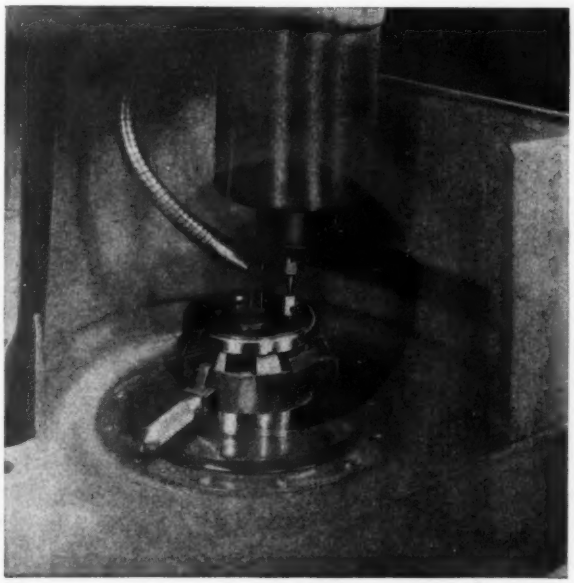
Depending on the setting of the selector switch, the pallet can be controlled to stop at any of the 20 stations. For the various parts currently being produced by the machine from six to eight working stations are used per part. Since these are different for the various parts, all 20 stations are used at present.

Parts are loaded horizontally into the fixtures that hold them. They are located against interchangeable V-blocks and adjustable stop blocks. Part clamping is manually done with clamps that can be interchanged to suit the part being produced.

H○LES

JIG GROUND with

Vulcanaire



VULCANAIRE AIR MOTOR ON PRODUCTION

Production cams with eight slots to be ground to tenths of thousandths. A special machine was used for indexing and oscillating. The Vulcanaire holds up under severe production schedules. Production ground parts to close tolerances! Another satisfied customer.

Provide yourself with this inexpensive instrument for use on your present equipment and JIG GRIND with a guarantee.

{ Borrow our instructive 11 minute movie on Jig Grinding. }

SERVICES OF YOUR TOOL ROOM IN DAYTON
ENGINEERING • PROCESSING • BUILDING • TOOLS
DIES • SPECIAL MACHINES • VULCANAIRE JIG
GRINDERS • MOTORIZED ROTARY TABLES • BREHM
"SHIMMY" AND RELATED DIES • AUTOMATION

Vulcan's 41st Year

VULCAN TOOL COMPANY
741 Lorain Ave., Dayton 10, Ohio

VULCAN tools

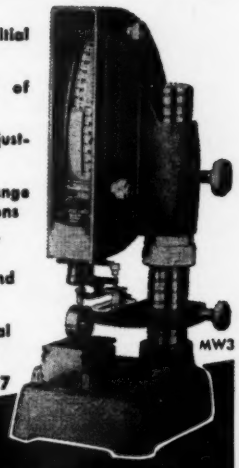
CIRCLE INFORM-A-GRAM KEY NO. 771

Leitz TOLERATOR
THE TRU-VISION
COMPARATOR GAGE

Capacity 6" Diameter

- Positive action through low-ratio initial amplification of 4:1
- Additional optical amplification of 250:1 = total of 1000x
- Rapid quantity gaging between adjustable colored tolerance masks
- Selective inspection from long range illuminated scale with 100 divisions
- Direct effortless reading in .00005"
- Variety of interchangeable anvils and contact tips
- Instrument also available for internal gaging

Request 8-page catalog 82-177



OPTO-METRIC TOOLS, INC.
137 TP VARICK STREET, NEW YORK 13, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 772

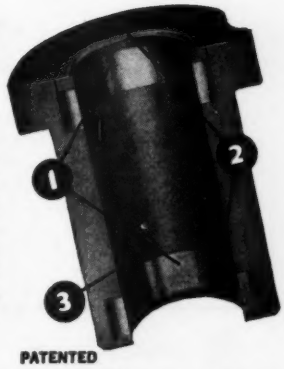
MEYCO CARBIDE INSERTED DRILL JIG BUSHINGS PROVE THEMSELVES

IN Automation !

The reason is simple: these unique bushings are ideally suited for long-running, uninterrupted operations!

MEYCO carbide inserted bushings assure long life for drills, jigs, fixtures . . . accurate work maintained, resulting in less down-time, fewer lost man-hours. Last almost as long as solid carbide bushings, cost slightly more than ordinary bushings. Get the full story:

Write for information and price list, ask for Catalog No. 41.



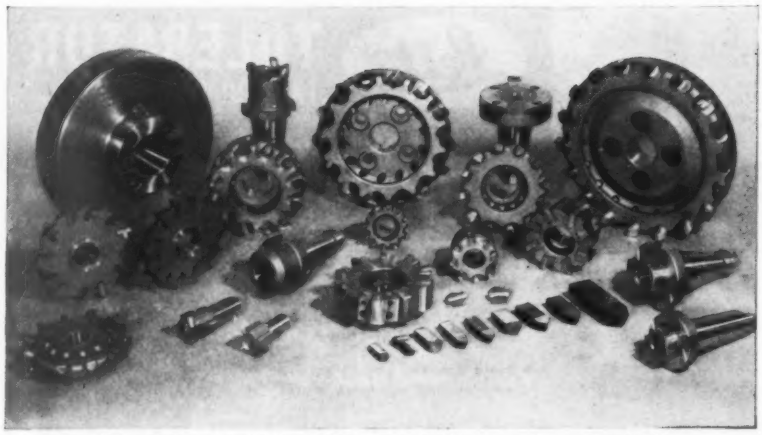
PATENTED

1. Tungsten carbide rings at the points of wear; 2. Steel rings protect drills and carbide; 3. Special hardened alloy steel body.

EST. 1868

W. F. MEYERS CO., INC., BEDFORD, INDIANA

CIRCLE INFORM-A-GRAM KEY NO. 773



Milling Cutters — End Mills — Blades — Boring Tools —→Arbors — Flywheels

These Lovejoy Products can help you Cut Costs!

The entire line of Lovejoy Milling Cutters and Accessories is designed to aid you in getting better production at less cost.

If you are not now using Lovejoy products, we invite you to do so at first opportunity.

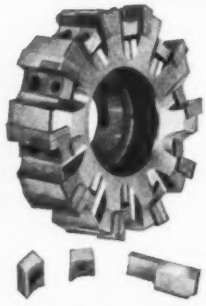
Lovejoy precision-engineered tools include:

Inserted-tooth milling cutters (face, side, end, slotting and boring) which feature husky, forged steel housings; exclusive Lovejoy "positive-locking" blade assembly; a variety of dozens of models and hundreds of sizes.

Blades: H.S.S., Vasco Supreme and carbide. These are interchangeable over a wide range of housing sizes, and Type "A" face milling blades will fit any standard Lovejoy Type "A" cutter of 4½" to 24" dia. All Lovejoy blades are carried in stock, ready for immediate shipment. Special cutters are a Lovejoy specialty.

NEW "JOYDEX"

This performance-proved face mill features indexable blades for low cost-per-edge cutting. Exclusive design improvements include — adjustable anvils • extra deep chip flutes • fast, easy indexing • sweep blades for fine finish • double positive, or combination positive and negative rake angles merely by changing blades • rugged, one-piece body • large locking screws. *Try out a new "Joydex" and prove its superiority! ("Joydex" data sheet is yours for the asking).*



Catalogs — include: "Face Mill Catalog No. 31; Side Mill Catalog No. 32; Type "S" Bulletin; Arbor Catalog No. 33; "Speed and Feed" Calculator. Write today for copies desired.

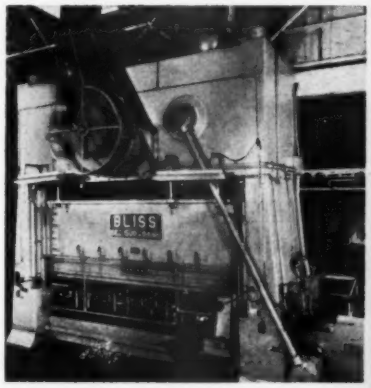
LOVEJOY TOOL COMPANY, INC.
Springfield, Vermont, U.S.A.

CIRCLE INFORM-A-GRAM KEY NO. 78

1500-Ton Press Uses Portable Transfer Feed

A new straight-side, two-point single-action eccentric press, as well as a portable transfer feed designed in conjunction with it, has been built for the Timken Roller Bearing Company.

This Bliss-built press of 1500-ton capacity, with coil feed, will accept the console driving unit of the automatic transfer feed at either end of its 204" right-to-left bed so work may be either pushed or pulled through the eight die stations on the press. The console may be press-driven by means of a power takeoff as shown in the photograph, or it may be independently powered and set up to control the press cycle



The automatic transfer feed features removable bar sections which permit easier die maintenance. Feed stroke is adjustable from 15" to 30" and the feed rails may be extended from the press itself to serve as a conveyor to other operations. Front-to-back dimensions of the feed rails may be adjusted with suitable cross shafts between the bars. In addition, individual feed bar sections may be removed without disturbing settings.

The main drive of the press is powered by a 200-hp Louis-Allis motor, while a 30-hp motor controls slide adjustment up to 6". The press runs 12 to 15 strokes/min; length of stroke is 16".

Deaths

William H. Eisenman, 73, secretary and founder-member of the American Society for Metals, died May 30 in a LaJolla, Calif., hospital.

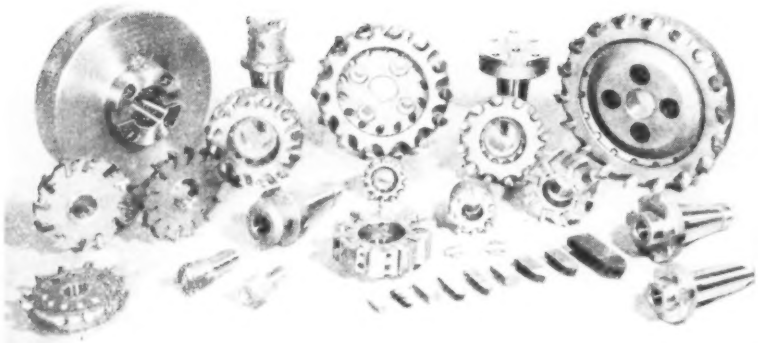
Howard A. Kenworthy, 73, a retired executive of the Tube Reducing Corporation, Wellington, N. J., died June 9.

THE NEW

No. 2 UNIVERSAL GRINDER

FEATURES:

PARKER • MAJESTIC PM PRECISION MACHINES



Milling Cutters — End Mills — Blades — Boring Tools —•Arbors — Flywheels

These Lovejoy Products can help you Cut Costs!

The entire line of Lovejoy Milling Cutters and Accessories is designed to aid you in getting better production at less cost.

If you are not now using Lovejoy products, we invite you to do so at first opportunity.

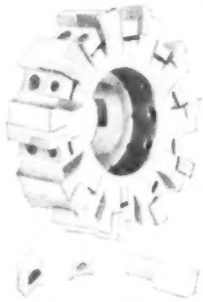
Lovejoy precision-engineered tools include:

Inserted-tooth milling cutters (face, side, end, slotting and boring) which feature husky, forged steel housings; exclusive Lovejoy "positive-locking" blade assembly; a variety of dozens of models and hundreds of sizes.

Blades: H.S.S., Vasco Supreme and carbide. These are interchangeable over a wide range of housing sizes, and Type "A" face milling blades will fit any standard Lovejoy Type "A" cutter of 4½" to 24" dia. All Lovejoy blades are carried in stock, ready for immediate shipment. Special cutters are a Lovejoy specialty.

NEW "JOYDEX"

This performance-proved face mill features indexable blades for low cost-per-edge cutting. Exclusive design improvements include — adjustable anvils • extra deep chip flutes • fast, easy indexing • sweep blades for fine finish • double positive, or combination positive and negative rake angles merely by changing blades • rugged, one-piece body • large locking screws. *Try out a new "Joydex" and prove its superiority! ("Joydex" data sheet is yours for the asking.*



Catalogs — include: "Face Mill Catalog No. 31; Side Mill Catalog No. 32; Type "S" Bulletin; Arbor Catalog No. 33; "Speed and Feed" Calculator. Write today for copies desired.

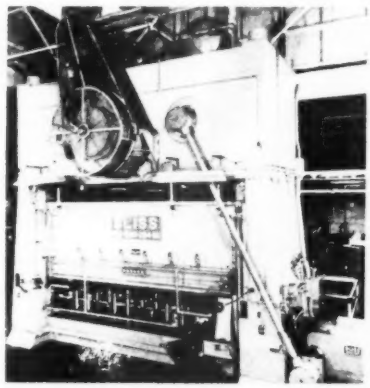
LOVEJOY TOOL COMPANY, INC.
Springfield, Vermont, U.S.A.

CIRCLE INFORM-A-GRAM KEY NO. 78

1500-Ton Press Uses Portable Transfer Feed

A new straight-side, two-point single-action eccentric press, as well as a portable transfer feed designed in conjunction with it, has been built for the Timken Roller Bearing Company.

This Bliss-built press of 1500-ton capacity, with coil feed, will accept the console driving unit of the automatic transfer feed at either end of its 204" right-to-left bed so work may be either pushed or pulled through the eight die stations on the press. The console may be press-driven by means of a power takeoff as shown in the photograph, or it may be independently powered and set up to control the press cycle.



The automatic transfer feed features removable bar sections which permit easier die maintenance. Feed stroke is adjustable from 15" to 30" and the feed rails may be extended from the press itself to serve as a conveyor to other operations. Front-to-back dimensions of the feed rails may be adjusted with suitable cross shafts between the bars. In addition, individual feed bar sections may be removed without disturbing settings.

The main drive of the press is powered by a 200-hp Louis-Allis motor, while a 30-hp motor controls slide adjustment up to 6". The press runs 12 to 15 strokes/min; length of stroke is 16".

Deaths

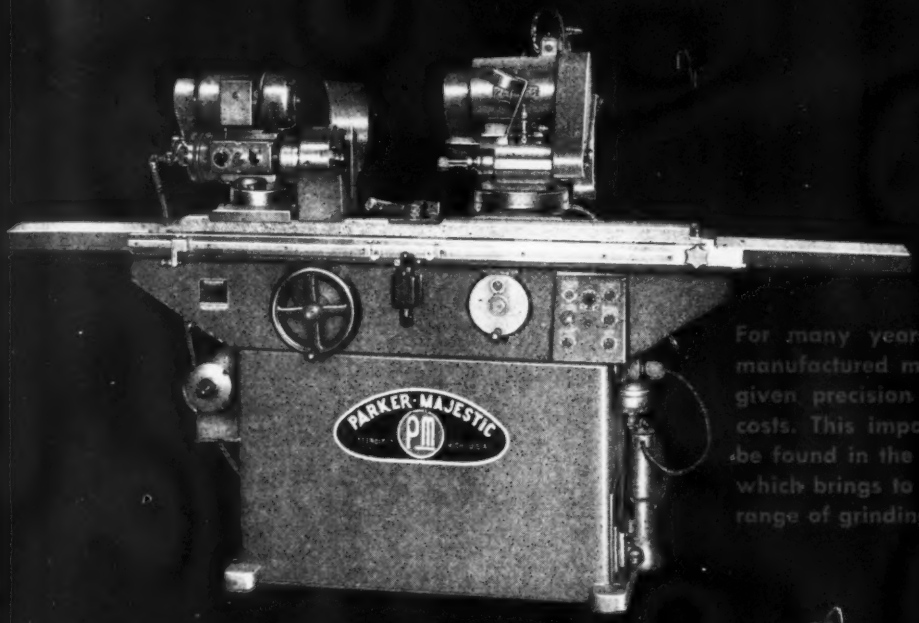
William H. Eisenman, 73, secretary and founder-member of the American Society for Metals, died May 30 in a LaJolla, Calif., hospital.

Howard A. Kenworthy, 73, a retired executive of the Tube Reducing Corporation, Wellington, N. J., died June 9.

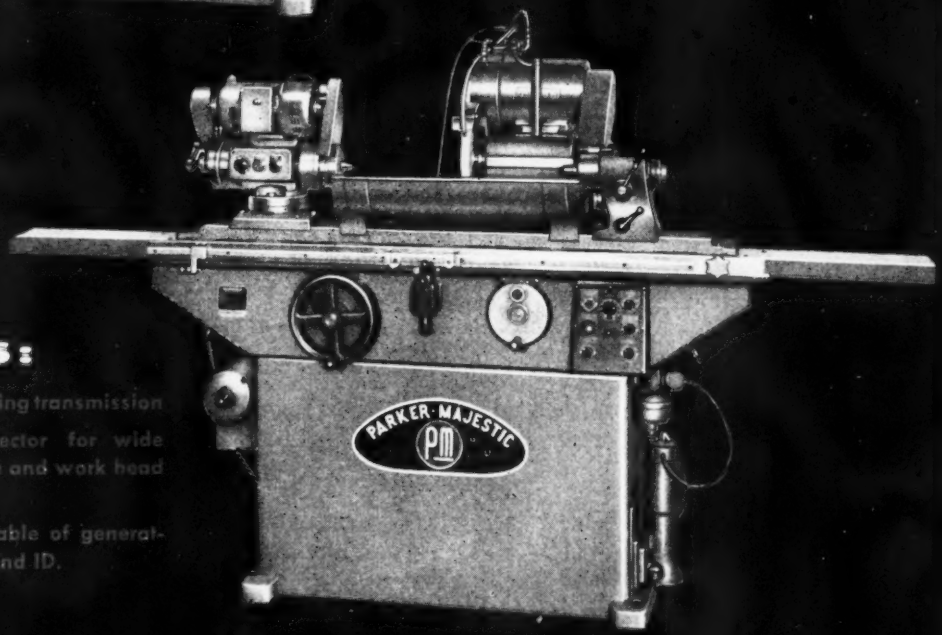
• GREATER IN PERFORMANCE
• LOWER IN COST

THE NEW *Parker Majestic*

No. 2 UNIVERSAL GRINDER



For many years, Parker-Majestic has manufactured machine tools that have given precision performance at lower costs. This important factor will again be found in the new Universal Grinder which brings to industry a much wider range of grinding operations.



FEATURES:

1 Electromagnetic reversing transmission

2 Dial type speed selector for wide range of table traverse and work head rotational speeds.

3 100% universal. Capable of generating angles, both OD and ID.

PARKER • MAJESTIC PM PRECISION MACHINES

PARKER MAJESTIC, INC. DETROIT 7, MICHIGAN

PUBLICATION PREVIEWS

"Plain Talk on Beryllium" tells how to properly handle beryllium to avoid health hazards. Beryllium metal and beryllium oxide, soluble beryllium compounds, and beryllium casting and master alloys are discussed. Get your copy from the Beryllium Corp., P. O. Box 1462, Reading, Pa., or — **Circle No. B1.**

Replaceable Coil Terminal for all induction heaters, Re-Coil, is offered in a bulletin which shows how costly shut-down time is eliminated and proper alignment is assured. Get details by writing L. C. Miller Co., 5005 E. Slauson Ave., Los Angeles 22, for this bulletin, or — **No. B2.**

Metal Cutting Band Saws available from Johnson Mfg. Corp., Crystal St., Albion, Mich., are listed in a catalog which gives model specifications and construction features. Write to the company for a copy of this catalog, or — **Circle No. B3.**

Carbide Throw-Away Inserts have been announced by Pratt & Whitney Co., Inc., Charter Oak Blvd., W. Hartford 1, Conn., in a bulletin. Both negative and positive rake, either

utility or precision ground, are listed in chart form. Dimensional diagrams of the different styles are included. Write the company for your copy, or—**Circle Inform-A-Gram No. B4.**

A Key-Aligned Die, added to the Hovis standard line of interchangeable-part compound dies, is featured in a bulletin. Specifications for the universal master compound dies and the interchangeable parts are also included. Get this bulletin from Hovis Screwlock Co., 8100 E. Nine Mile Rd., P. O. Box G, Warren, Mich., or — **Circle Inform-A-Gram No. B5.**

"Automatic Insert-Cast and Insert-Molded Small Parts" describes this process which turns out insert components of uniform dimensions to close tolerances. Maximum sizes of cast or molded parts are also listed in this bulletin, which gives details. Get yours from Gries Reproducer Corp., 125 Beechwood Ave., New Rochelle, N. Y., or — **Circle No. B6.**

"Cincinnati Surface Grinding Wheels" describes straight-sided wheels, segments, cylinders, cups, and nut-inserted wheels for surface grinding operations. A table of suggested grades for surface grinding is included. For this booklet, write Cincinnati Milling Products Div'n, Cincinnati Milling Machine Co., Cincinnati 9, or — **Circle No. B7.**

"Vitrified and Resinoid Bonded Grinding Wheels" gives complete grinding wheel specifications for all classes of work. Dimensional drawings show different standard wheel shapes. Write to Simonds Worden White Co., 1101 Negley Pl., Dayton 7, Ohio, for your copy, or — **No. B8.**

Removes Metallic Chips and Abrasive Particles

Delpark Gravity CLARIFICATION

For CUTTING and GRINDING OILS and WATER BASE COOLANTS

The Delpark Gravity Clarification Unit handles direct flow of coolants with controlled velocity to permit metallic chips and abrasive particles to settle out.

Minimum turbulence permits more positive gravity action in the settling of particles. Attains a clarifying efficiency of 75 to 90% depending on the type of solids to be removed.

Heavy duty chain conveyor flights remove settled particles to sludge box. Unit is completely automatic—requires only removal of sludge deposited in tote box.

Flow capacities range from 20 to 1000 g.p.m. Tank capacities from 140 to 7,600 gallons.

Write for more complete details in Delpark's new Gravity Clarification Unit 4-page folder. There's a Delpark field engineer near you to supply immediate information.

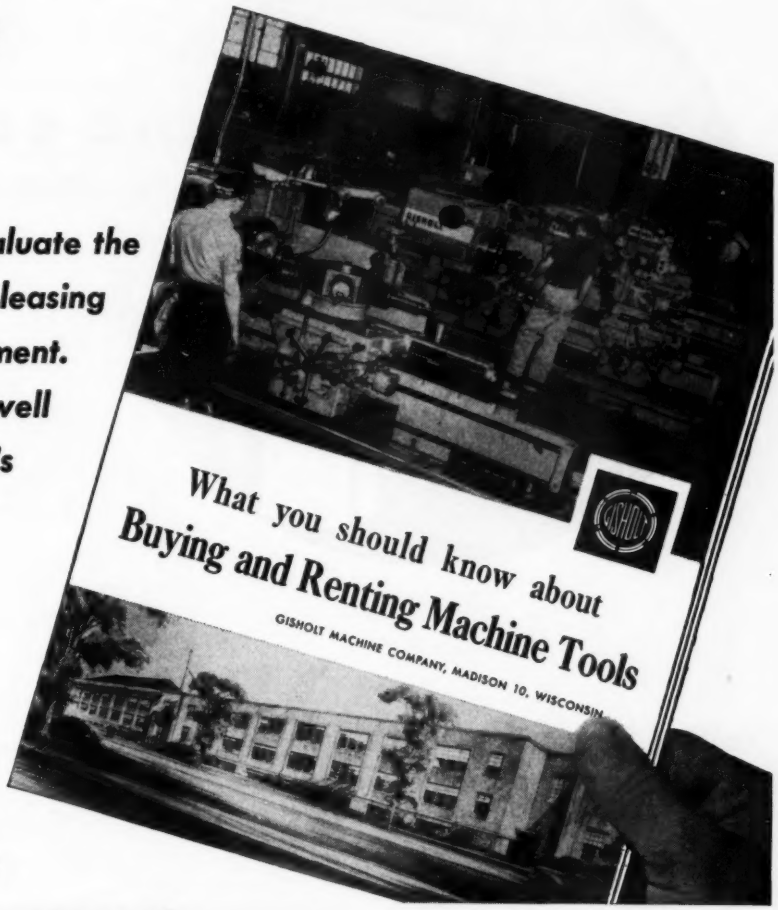
Delpark

FILTRATION FOR INDUSTRY
Indiana Commercial Filters Corporation
Delpark Division
LEBANON, INDIANA
Subsidiary of Commercial Filters Corporation

CIRCLE INFORM-A-GRAM KEY NO. 80

Can your competitors turn metal at lower costs?

Now is the time to re-evaluate the possibilities offered by leasing of new production equipment. Your decision today can well determine your company's position in tomorrow's competitive market.



This free booklet tells how you can get new machines with minimum capital outlay

If you have delayed replacing old machines because of the relatively large capital investment, acquisition by methods other than outright purchase may solve your problems. Only a minimum initial investment provides you with the many competitive advantages that new machines offer, including greater accuracy, higher production rates and faster setup. New features and accessories simplify even the toughest jobs. Secondary operations are minimized and spoiled work becomes a thing of the past. All this means lower unit cost—more profit for you.

If you want the benefits that new machine tools can provide, and if you like the idea of letting them "pay their way" while they "turn" a profit for you, you'll want to write for Gisholt Bulletin 1173 on buying and renting machine tools. It fully explains one of the most liberal and comprehensive policies in the industry, and covers several types of leasing and time payment plans with vital information on depreciation, tax angles, the MAPI formula and other timely questions. The coupon will bring your free copy. Send it along today.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

ASK YOUR GISHOLT REPRESENTATIVE ABOUT FACTORY-REBUILT MACHINES WITH NEW-MACHINE GUARANTEE

Gisholt Machine Company
1202 E. Washington Ave.
Madison 10, Wisconsin

Without obligation, please send your Bulletin 1173.

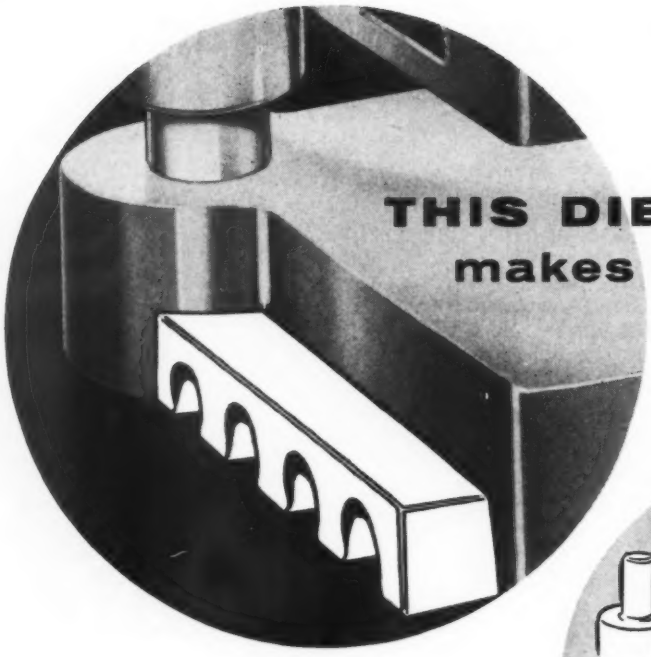
Name.....*Title*.....

Company.....

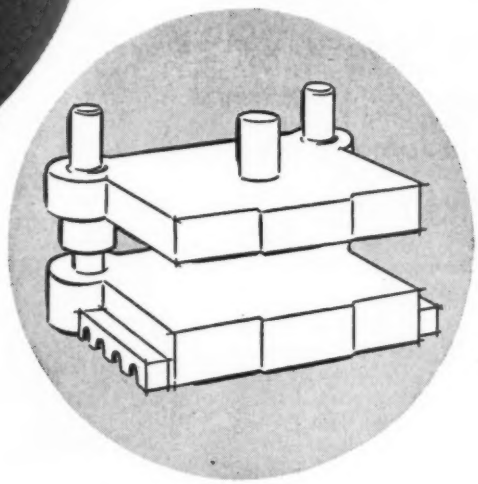
Street address.....

City.....*Zone*.....*State*.....

CIRCLE INFORM-A-GRAM KEY NO. 81

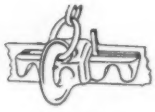


THIS DIE SET FEATURE
makes money for you

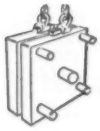


Additional Superior Features that speed handling, lower die making costs.

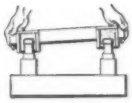
SAFETY FLANGE
protects fingers by providing roomy gripping space on either side of the die shoe.



LOCK-JAW LIFTING DEVICE
removes the danger of handling large die sets.



E-Z LIFT SLING CHAIN
attach to the lock-jaw for immediate lifting.



"REMOVABLE CAP" PINS
End troublesome binding in parting dies.

LIMITLESS RANGE OF DIE SET SIZES JIG BORED TO YOUR SPECIFICATIONS . . .

Competitively priced in all given sizes.

SUPERFINISH GUIDE PINS ON ALL SUPERIOR DIE SETS

Maximum Surface Hardness, Increased Bearing Surface,
Longer Pin and Bushing Life,
Smoother Action

SUPERIOR SAFETY FLANGES

Exclusive on all Superior Die Sets

Just one of many Exclusive Superior Die Set Features that save time, cut your die making costs and build your profits. Safety Flanges protect fingers by providing roomy gripping space on either side of the die shoe. Combined with Superior's LOCK JAW LIFTING DEVICE it permits lifting of small and large sets quickly, safely and easily. Large sets need not be blocked for handling. Truly a time and money saver in your shop.

Our 35 years of engineering experience are at your disposal, write today for 32 page catalog giving complete details or call one of the expert representatives in your area.

For fast local service call these Superior Representatives.

2 plants to serve you

Milwaukee, Wis. Mitchell 5-6027
Plainville, Conn. Sherwood 7-2761
Kalamazoo, Mich. Fireside 5-7988
St. Louis, Mo. Jefferson 5-1223
Indianapolis, Ind. Clifford 5-5668
Rockford, Illinois 5-3931
Dayton, Ohio Hemlock 6209
Minneapolis, Minn. Franklin 1-1321
Chicago, Ill. Randolph 6-8871
Memphis, Tenn. Fairfax 3-7727
Denver, Colo. Enterprise 234
Winter Park, Fla. 4-0464
Racine, Wis. Melrose 2-1900
Cedar Rapids, Ia. Empire 2-7831
Caldwell, N. J. Caldwell 6-9337
West Newton, Mass. Bigelow 4-2070
Agawan, Mass. Republic 9-1132
Brooklyn, N. Y. Esplanade 6-1388
Cheshire, Conn. Browning 2-4887
Warwick, R. I. Turner 4-2907

SUPERIOR STEEL PRODUCTS CORP.
2754 S. 19th ST. MILWAUKEE, WIS

CIRCLE INFORM-A-GRAM KEY NO. 82

Cams, Cam Blanks, standard and special form tools, and other tool holders and accessories for automatic screw machines are presented in a

catalog. Dimensional drawings and specifications of the items are given. Copies of this catalog are distributed by The American Cam Co., Inc., P. O. Box 2106, Hartford, Conn., or —

Circle Inform-A-Gram No. B9.

A High-Speed Framing System for building repeating pattern structures with Acme Steel Dexion slotted angles and Dexion accessories, is described in a booklet. The system works on any size job, but is especially economical for building shelving, racks, tables, or platforms. Acme Steel Co., 135th and Perry Ave., Chicago 27, supplies copies of the booklet, or — **Circle No. B10.**

Drill, Counterbore, Chamfer, or Ream in the center of any round, square, or hexagon stock with the Center Master drill press attachment, described in a bulletin. Included are illustrations of work and the operational features of the attachment. Write Center Master Corp., 3757 S. Kinnickinnic Ave., Milwaukee 7, or

Circle Inform-A-Gram No. B11.

Solid Carbide Center Cutting End Mills are described in a bulletin which explains how the Series 400 cuts all non-ferrous materials and cast iron, and is good for blind slots as small as ⅛" wide. Ask for Bulletin C-23 from Cutting Tool Div'n, Brown & Sharpe Mfg. Co., Providence 1, or — **Circle No. B12.**

Single-Action Straight-Side Single-Crank Presses in 60- to 400-ton capacities are discussed in a bulletin. Included are detailed diagrams of the presses and press drives. A chart gives specifications. The Federal Machine and Welder Co., Warren, Ohio, supplies copies of the bulletin, or —

Circle Inform-A-Gram No. B13.

Save Time and Cut Cost on combinations of boring, turning, and facing — including tapers, contours, grooves, and chamfers — with the Model 30-008 standard cam-operated precision contouring machine. A bulletin gives specifications and diagrams of the machine. Write to The Olofsson Corp., 2739 Lyons Ave., Lansing, Mich., for your copy, or —

Circle Inform-A-Gram No. B14.

A Transfer Unit, adaptable for drilling, tapping, and other machine operations, is outlined in a bulletin. Specifications for two models, and detailed drawings showing the progression of the units, are given. Write Livernois Engineering Co., 25200 Trowbridge, Dearborn, Mich., for a copy, or — **Circle No. B15.**

Choose the Correct Style Holder and Insert from the information contained in "Throwaway Tooling Set-Up and Follow Thru." A guide to grade selection in machining steel and certain nickel alloys, and rules for proper throw-away use are also presented. Adamas Carbide Corp., Kenilworth, N. J., offers the booklet, or—**Circle Inform-A-Gram No. B16.**

HOW TO FIGURE PRESS FEEDING

Economy!

UNIT COST DOWN, PROFITS UP! WITH DICKERMAN AUTOMATIC PUNCH PRESS FEEDS . . . AND HERE'S THE REASON WHY . . .

Hand Feeding . . .

8 hrs. @ 2000 pieces/hr. 16,000

Labor @ $1.60 hr. $12.80
Cost per M pieces —

80¢

with Dickerman Feeds (83% press efficiency)

8 hrs. @ 100 RPM x 60 48,000

Labor @ $1.60 hr. $12.80
Cost per M pieces —

22½¢

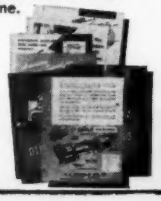
Dickerman Press Feeds don't get tired. Dickerman Press Feeds produce — and keep on producing — 24 hours a day if necessary without let-down, human error. Downtime is negligible—even on million plus runs.

Dickerman Press Feeds mean real savings, real gains. Dickerman Feeds cost little to install — pay for themselves in days — pay profits year after year AND as Dickerman Feeds will operate at any speed the tooling will withstand, unit cost drops as production increases. For automation . . . For new economy . . . install dependable Dickerman Feeds on all your press equipment now!

TOOL AND DIE DESIGNERS . . . .

Full scale templates on all Dickerman Hitch Feeds®, Die Feeds and Rol-Di-Feeds available upon request.

SEND today for catalogs on the complete money-making Dickerman line.



Dickerman

H. E. DICKERMAN MFG. CO.

321-416 Albany St. • Springfield, Mass.

CIRCLE INFORM-A-GRAM KEY NO. 83

Dress Grinding Wheels quickly and accurately with the direct-reading Tangi-Matic dresser offered in a bulletin. Features and tips on how to use the wheel dresser are discussed. Get your copy from Threadwell Tap & Die Co., Greenfield, Mass., or — **Circle No. B17.**

Electrical and Lubricating Devices and their usage are explained in a catalog which lists sizes and capacities for automatic oilers, industrial fuses, fuse pullers, fuse reducers, and fuse and test clamps. Trico Fuse Mfg. Co., Milwaukee 12, supplies copies of Catalog 58, or — **No. B18.**

An Electromagnetic Vibrator, designed to vibrate very small hoppers and tracks and chutes of processing, assemblying, and packaging machines, is described in a data sheet. Dimensions of three standard models are given. Get the data sheet from Syntron Co., Homer City, Pa., or — **Circle Inform-A-Gram No. B19.**

A Gage Block Inspection Service is explained in a bulletin which describes two types — recalibration of working blocks and inspection of laboratory blocks. Ask for Bulletin 8-5 from Fonda Gage Co., Inc., Stamford, Conn., or — **Circle No. B20.**

PUTNAM POSTIV-LOK END MILLS

Putnam takes the shank off the end mill . . .

. . . puts it on a holder that soon pays for itself.

Postiv-Lok adapters simplify change-over to small end mills, shell end mills and drills.

Eliminate integral tapered shanks and cumbersome tool changing on heavy end mill jobs with the new, proven Postiv-Lok end mills. They'll cut your end mill costs up to 25%, give smooth, chatter-free cutting through torque-aided locking. Write for catalog on your letterhead.

Putnam Distributors from Coast-to-Coast carry large stocks of standard end mills. Contact your neighbor, the local Putnam Distributor, he will recommend the best end mill for specific jobs, give you personalized service, and quickly supply your needs with the finest end mills obtainable.

PUTNAM TOOL COMPANY
2981 CHARLEVOIX AVENUE · DETROIT 7, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 84

For Milling, Boring, and Duplicating, use the Mastermil vertical milling machine, described in a bulletin. The machine has a spindle speed

range of from 80 to 5600 rpm, 4" spindle travel, and 10" x 42" table working surface. Get Bulletin 2699-B from George Gorton Machine Co., Racine, Wis., for details, or — **B21.**

Dial Indicators are presented in a catalog which contains information on the four A.D.G. groups. This Em-Re line has 10 ranges from 0.002" to 1.000" in a variety of graduations. The Master dial indicator checker is also described. For copies of Catalog D, write Petz-Emery Inc., Pleasant Valley, N. Y., or — **Circle No. B22.**

Positive and Negative Rake Toolholders are listed, and dimensions and diagrams are presented, in a bulletin. Also listed are Talide throwaway inserts. For more information on these Klamp-Lok toolholders, get Catalog KL-58 from Metal Carbides Corp., 6001 Southern Blvd., Youngstown 12, Ohio, or — **Circle Inform-A-Gram No. B23.**

A Chromium Die Steel, Viscount 20, recommended for extrusion dies, die-casting dies, and other hot work applications where improved machinability is of primary importance, is explained in a bulletin. Forging, annealing, hardening, and tempering qualities are discussed. Write Latrobe Steel Co., Latrobe, Pa., or — **Circle Inform-A-Gram No. B24.**

"Precision Metallurgical Services" describes Hamilton Watch's production and processing of made-to-order metals in experimental and production quantities. Facilities for melting, forging, hot and cold rolling, and heat-treating are discussed. Write Precision Metals Div'n, Hamilton Watch Co., Lancaster, Pa., or — **Circle Inform-A-Gram No. B25.**

READER SERVICE CARD — AUGUST 1958 ISSUE

DO NOT USE THIS CARD AFTER OCT. 31, 1958

INFORM-A-GRAM

YOUR NAME _____ YOUR TITLE _____
(Please Print or Typewrite)

TOOLING and PRODUCTION:

Please have information on items circled **sent to me.**

COMPANY NAME _____

COMPANY ADDRESS _____

CITY _____ ZONE _____ STATE _____

(Please use only one of these INFORM-A GRAM cards for yourself and let one of your associates use the other.)

ADVERTISEMENTS									EDITORIAL ITEMS						
2	20	59	81	113	912	1002	1084	1173	A1	A19	A37	A55	B11	B29	C7
3	21	60	82	125	913	1003	1111	1181	A2	A20	A38	A56	B12	B30	C8
4	22	61	83	126	914	1004	1112	1182	A3	A21	A39	A57	B13	B31	C9
5	23	62	84	721	921	1005	1113	1183	A4	A22	A40	A58	B14	B32	C10
6	24	63	85	722	922	1031	1121	1184	A5	A23	A41	A59	B15	B33	C11
7	25	64	86	723	923	1032	1122	1191	A6	A24	A42	A60	B16	B34	E1
8	26	65	87	724	941	1033	1123	1192	A7	A25	A43	A61	B17	B35	E2
9	27	66	89	751	942	1041	1124	1193	A8	A26	A44	A62	B18	B36	E3
10	29	67	93	752	943	1042	1151	1194	A9	A27	A45	B1	B19	B37	
11	30	69	95	753	944	1043	1152	1211	A10	A28	A46	B2	B20	B38	
12	31	70	96	771	971	1071	1153	1212	A11	A29	A47	B3	B21	B39	
13	33	71	98	772	972	1072	1154	1241	A12	A30	A48	B4	B22	B40	
14	34	73	101	773	973	1073	1161	1242	A13	A31	A49	B5	B23	C1	
15	36	74	102	881	991	1074	1162	1243	A14	A32	A50	B6	B24	C2	
16	53	76	105	882	992	1075	1163	1244	A15	A33	A51	B7	B25	C3	
17	55	78	106	883	993	1081	1164	1245	A16	A34	A52	B8	B26	C4	
18	57	79	109	884	994	1082	1171	1246	A17	A35	A53	B9	B27	C5	
19	58	80	110	911	1001	1083	1172	1247	A18	A36	A54	B10	B28	C6	

Which article in this issue was of most interest to you? _____

THESE INFORM-A-GRAM CARDS are for the convenience of *TOOLING and PRODUCTION* readers who, we know, rarely have stenographic help at their beck-and-call while reading. To get further information concerning selected items featured — all one needs is an INFORM-A-GRAM card and a pencil or pen to circle the numbers of the items wanted. If there is no identifying number, use the page number.

Our reader service department is handling over 100,000 reader inquiries per year and it is essential that the blanks at the top of each card be filled in accurately and completely. Please use only one of these INFORM-A-GRAM cards for yourself and let one of your associates use the other.

READER SERVICE CARD — AUGUST 1958 ISSUE

DO NOT USE THIS CARD AFTER OCT. 31, 1958

INFORM-A-GRAM

YOUR NAME _____ YOUR TITLE _____
(Please Print or Typewrite)

TOOLING and PRODUCTION:

Please have information on items circled **sent to me.**

COMPANY NAME _____

COMPANY ADDRESS _____

CITY _____ ZONE _____ STATE _____

(Please use only one of these INFORM-A GRAM cards for yourself and let one of your associates use the other.)

ADVERTISEMENTS									EDITORIAL ITEMS						
2	20	59	81	113	912	1002	1084	1173	A1	A19	A37	A55	B11	B29	C7
3	21	60	82	125	913	1003	1111	1181	A2	A20	A38	A56	B12	B30	C8
4	22	61	83	126	914	1004	1112	1182	A3	A21	A39	A57	B13	B31	C9
5	23	62	84	721	921	1005	1113	1183	A4	A22	A40	A58	B14	B32	C10
6	24	63	85	722	922	1031	1121	1184	A5	A23	A41	A59	B15	B33	C11
7	25	64	86	723	923	1032	1122	1191	A6	A24	A42	A60	B16	B34	E1
8	26	65	87	724	941	1033	1123	1192	A7	A25	A43	A61	B17	B35	E2
9	27	66	89	751	942	1041	1124	1193	A8	A26	A44	A62	B18	B36	E3
10	29	67	93	752	943	1042	1151	1194	A9	A27	A45	B1	B19	B37	
11	30	69	95	753	944	1043	1152	1211	A10	A28	A46	B2	B20	B38	
12	31	70	96	771	971	1071	1153	1212	A11	A29	A47	B3	B21	B39	
13	33	71	98	772	972	1072	1154	1241	A12	A30	A48	B4	B22	B40	
14	34	73	101	773	973	1073	1161	1242	A13	A31	A49	B5	B23	C1	
15	36	74	102	881	991	1074	1162	1243	A14	A32	A50	B6	B24	C2	
16	53	76	105	882	992	1075	1163	1244	A15	A33	A51	B7	B25	C3	
17	55	78	106	883	993	1081	1164	1245	A16	A34	A52	B8	B26	C4	
18	57	79	109	884	994	1082	1171	1246	A17	A35	A53	B9	B27	C5	
19	58	80	110	911	1001	1083	1172	1247	A18	A36	A54	B10	B28	C6	

Which article in this issue was of most interest to you? _____

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

FIRST CLASS PERMIT No. 7879, CLEVELAND, OHIO

TOOLING & PRODUCTION MAGAZINE

P. O. BOX 3505

CLEVELAND 18, OHIO

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

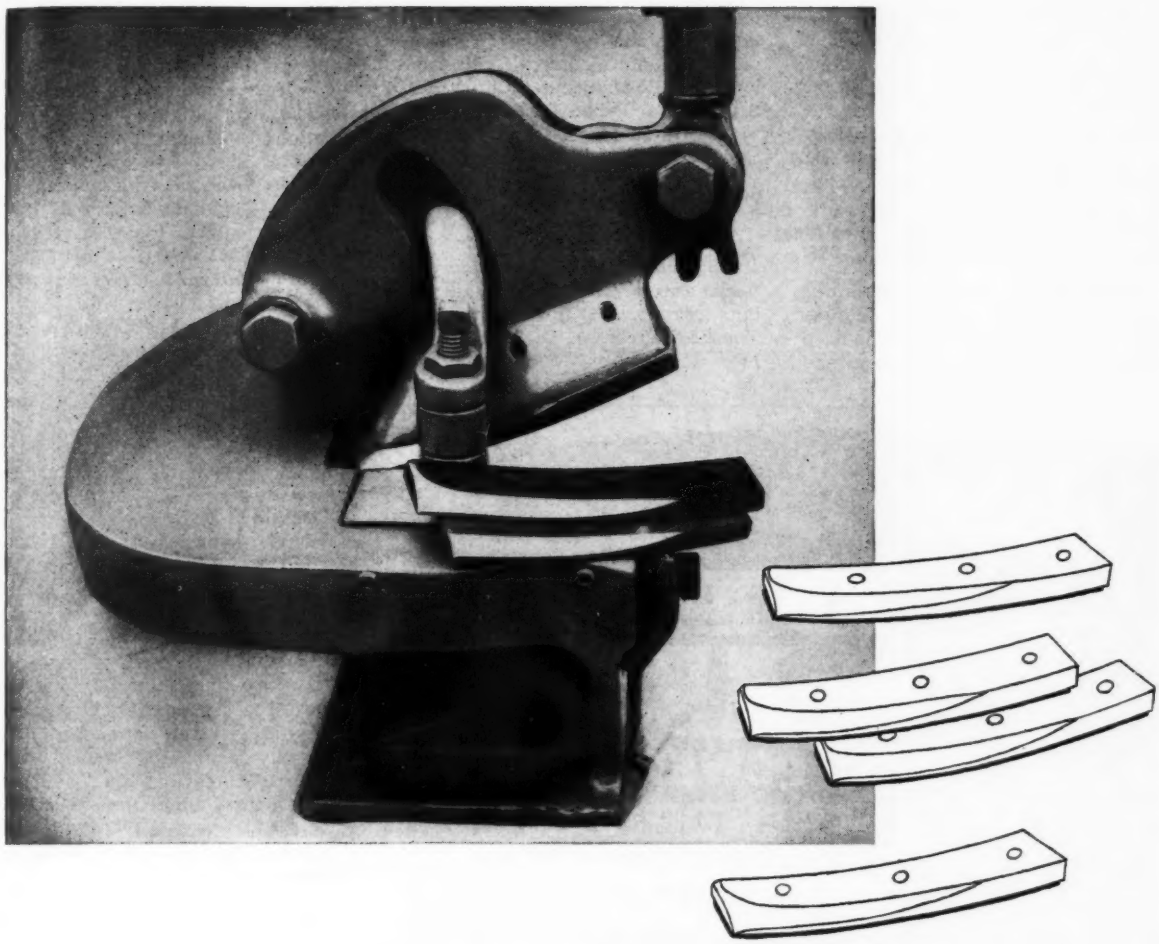
BUSINESS REPLY CARD

FIRST CLASS PERMIT No. 7879, CLEVELAND, OHIO

TOOLING & PRODUCTION MAGAZINE

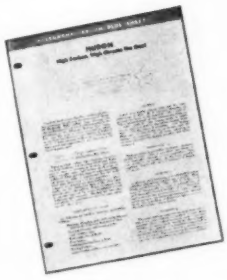
P. O. BOX 3505

CLEVELAND 18, OHIO



Shear Manufacturer ups blade life 4 to 5 times...

with A-L HURON DIE STEEL



Write for Your
HURON BLUE SHEET

A compilation of facts on the handling and shop treatment of Huron. Includes complete information on forging, annealing, tempering, etc. and detailed laboratory data on physical characteristics. *Ask for your free copy.*

ADDRESS DEPT. TP-8

A Chicago bench shear manufacturer produced some test blades of A-L HURON die steel—heat treated to 61-62 Rockwell C.

Service life of the HURON blades proved to be four to five times that of the former blades. Resharpenings were reduced 75 to 80%! Because these new HURON blades held an exact rake and maintained a proper cutting arc, they easily sheared 3/16" mild steel or 10 gauge stainless.

HURON die steel was developed for use where high resistance to wear and abrasion is necessary, and where heavy pressure rather than sudden shock must be withstood. HURON has excellent non-deforming properties, and hardens to a great depth.

There is an A-L tool steel that will help solve your cutting, forming or blanking problem. Call our nearest office or distributor today about your requirements. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.***

For nearest representative, consult Yellow Section of your telephone book.

For complete MODERN Tooling, call

Allegheny Ludlum

WBW-4566

AL® FINE TOOL STEELS SINCE 1854

CIRCLE INFORM-A-GRAM KEY NO. 85

"Imagineering in Steel," a 20-page catalog, explains the three steps in planning, cutting, and joining new Bild-A-Flex steel framework for shelving. Included are tables for calculating maximum loads for horizontal and upright framework. Berger Div'n, Republic Steel Corp., Dept. SBL, 1038 Belden Ave., N.E., Canton 5, Ohio, will supply copies of Catalog ES-2058, or—**Circle No. B26.**

Screw Machine Tools are described and illustrated in a 26-page catalog, which also gives information on deep hole drilling tools, toolholders, and burnishing and knurling tools. Detailed diagrams and lists of replacement parts are included in this catalog from Boyar-Schultz Corp., 2000 S. 25th Ave., Broadview, Ill., or —

Circle Inform-A-Gram No. B27.

Increase Punch Press Production of secondary operations using the Feed-O-Matic punch press feeder described in a bulletin. Because resetting takes less than an hour, the feeder can be used for job and production runs. Get this bulletin from The V&O Press Co., Div'n of Emhart Mfg. Co., Hudson, N. Y., or — **B28.**

Now! THE ALL-NEW
DPS
MODEL U (Universal)
POWER SCREWDRIVER
WITH BRAND NEW FEATURES AND ADVANTAGES NEVER BEFORE AVAILABLE
NEW TYPE POSITIVE CONTROL CLUTCH
• Not affected by changes in temperature or excessive oil or grease
• Sharply increased accuracy as to variation in torque tolerance
• Simplified design for easy servicing
• Requires no daily lubrication
• No friction devices of any kind used
• Long service life on all parts subject to wear
NEW TYPE HOPPER DRIVING MECHANISM
• No gears to wear out
• No lubrication required
• No costly replacement parts
• Simple design for easy servicing
• Built-in slip control as a safety feature
Also furnished as a completely Self-Contained Driving Head for use in specially designed assembly machines.
NEW TYPE FEED TRACK AND ESCAPEMENT MECHANISM
• Flexibility for easy and fast adjustment
• Escapement does not require daily lubrication
• Escapement design permits releasing screws by body or head as required
• Positive solenoid action
• Simple design for easy servicing
• Adjustable for full capacity of machine
Write for NEW Brochure!
DETROIT POWER SCREWDRIVER CO.
2827 W. FORT ST. DETROIT 16, MICH.
CIRCLE INFORM-A-GRAM KEY NO. 86

Unusual Dimensional Stability, easier fabrication, and high salvage value are three advantages of "775," a new cast aluminum tooling plate material. A bulletin describes applications for machine tool fixtures, assembly jigs, hydropress form blocks, or wherever high accuracy and light weight are required. Get this bulletin from Red Seal Metals Co., 10035 Burtis St., S. Gate, Calif., or—**Circle Inform-A-Gram No. B29.**

150 "A" Line Air Cylinders are covered in a bulletin from Teer-Wickwire & Co., Jackson, Mich. A detailed drawing points out the special features of these cylinders, and specifications are given for several models. Accessories are also included. Direct requests for copies of Bulletin A-101 to the company, or

Circle Inform-A-Gram No. B30.

Three-Dimensional Machining at production rates of up to one part every 18 sec, is described in a brochure. It shows a typical two workstation machine, and the development of space configurations through hydraulically-actuated cams. Tri-Ordinate Corp., 335 Snyder Ave., Berkeley Heights, N. J., supplies copies of this bulletin, or — **No. B31.**

A Non-Slip, Anti-Vibration Spring Washer, the Sawtooth Belleville washer, is described in a bulletin which says this item is made for usage where spring action is required and non-slipping of components is desired. Diagrams and a list of available sizes are included. Get Bulletin ST-1 from George K. Garrett Co., Inc., Torresdale Ave. at Tolbut St., Philadelphia 36, or —

Circle Inform-A-Gram No. B32.

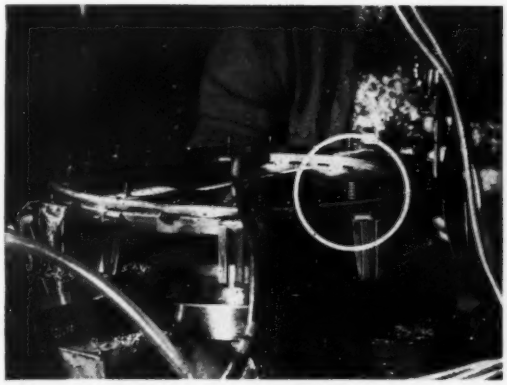
Simplified Operation, High Production, and ease of setup are some of the advantages of the Landis 6" CH and 10" LCH plain precision cylindrical grinders discussed in a catalog. The design features are illustrated and explained, and specifications are listed. Catalog B-57 is available from Landis Tool Co., Waynesboro, Pa., or — **No. B33.**

A Stop-Off Material, Seal-Stop, is a hot melt strippable coating used in electroplating that gives good adhesion and is easy to remove from the part. It eliminates painting or taping, can be remelted and reused, is non-toxic, and is quickly applied. For more information write to Seal-Peel, Inc., 775 Stephenson Highway, Royal Oak 3, Mich., for a bulletin, or—**Circle Inform-A-Gram No. B34.**

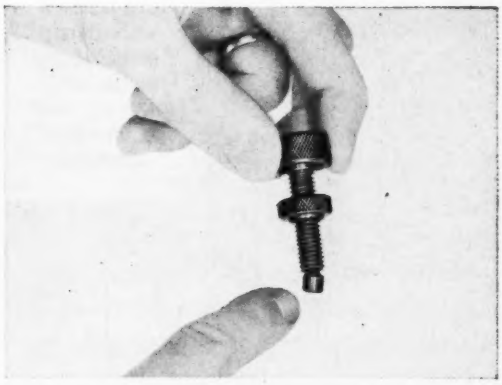
Practical Tooling Tips

No. 3 of a series

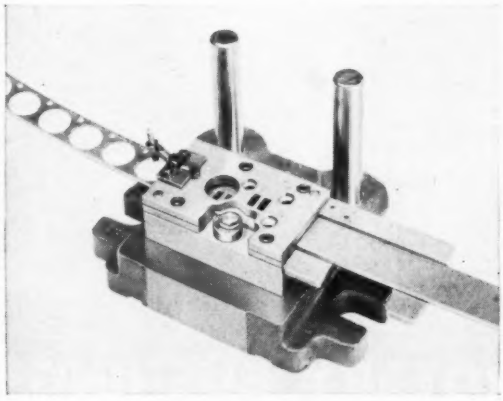
Are your tool makers wasting time making complicated tooling gadgets when a standard, off-the-shelf Vlier part could do the job much better? Why not examine your present drawings and see where these simple, low-cost parts can be used. You will be amazed at the savings possible.



PRODUCTION INCREASED 300% when this 12-station automatic indexing and tapping fixture was put to work. Vlier Spring Plungers allow the operator to load by simply pushing the part into a slot. These simple, spring-loaded tools also position the part for the tapping operation. Available in four models; fifty sizes.



NEW SWIVEL PAD-TORQUE THUMB SCREW combines the Vlier Torque Thumb Screw and Swivel Pad Clamp. The result is a perfect holding tool—one that applies only the right amount of holding pressure without damaging the finished surface. Unique ball joint construction of the pad permits adjustment to off-angle surfaces.



PROPER STOCK ALIGNMENT IN PROGRESSIVE DIES becomes a simple task with the new Vlier Stock Pusher. Saves pilots. Mounts in tapped hole. Accommodates stock as thin as .010"; width variations totalling 1/16". Nothing to wear out or foul up.

NEW 1958 CATALOG NOW AVAILABLE—Eight pages; completely revised. Includes information and specifications on all new Vlier products, including the Torque Handle, Stock Pusher, Leveling Pad. Makes ordering easy. Suggests new uses for these proven time-savers. Write for your copy today!

VLIER
Engineering Corporation
A subsidiary of Barry Controls, Inc.
8900 Santa Monica Blvd. • Los Angeles 46, California

CIRCLE INFORM-A-GRAM KEY NO. 87

FREE... 64 PAGE CATALOG

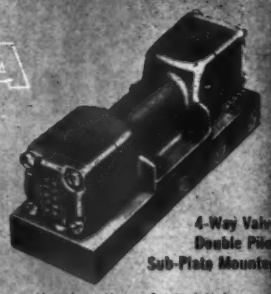
WORLD'S LARGEST LINE OF WORK HOLDING EQUIPMENT—CHUCK JAW BLANKS, CAST ALUMINUM AND MALLEABLE KNOBS, WHEELS, HANDLES—PLUS HUNDREDS OF OTHER JIG AND FIXTURE COMPONENTS

COMPLETE DETAILED SPECIFICATIONS
ENGINEERING DRAWINGS • COST SAVING DATA
write for your copy—TODAY!

JERGENS TOOL SPECIALTY CO.
Dept. TP-8 712 E. 163rd St., Cleveland 10, Ohio
CIRCLE INFORM-A-GRAM KEY NO. 881

FOR SUB-PLATE MOUNTING

VERSA Manifold Mount VALVES



4-Way Valve
Double Pilot
Sub-Plate Mounted

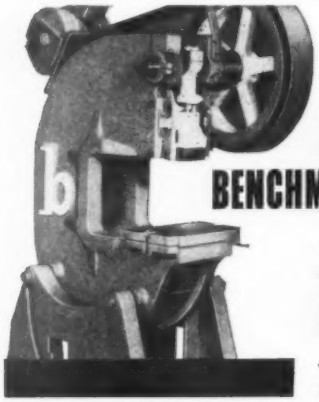
For any type of operation...there's a Versa Control Valve available for manifold mounting. These efficient, compact Control Valves are ideal for incorporation as original equipment. They can be installed directly on equipment or mounted on standard Manifold Plates (or Sub-Plates).

Versa Manifold Mount Valves are available with any type of actuating device, in sizes from 1/8" to 1" NPT, in 2-, 3-, 4-, and 5-Way Types, and for pressures from partial vacuum to 500 PSIG.

Over 110,000 Variations...
Available for Immediate Delivery!

VERSA

VERSA PRODUCTS COMPANY INC.
SCHOLES STREET, BROOKLYN 6, N.Y.
CIRCLE INFORM-A-GRAM KEY NO. 883



MEASURE THIS BENCHMASTER THROAT

...the small press that does **BIG** press jobs!

There's no matching Benchmaster variety and versatility. For example, Benchmaster makes *17 different press models with many variations of each* . . . in stroke length, shut height and throat depth.

This 8 ton **BENCHMASTER DEEP THROAT PRESS** is typical of Benchmaster strength and ruggedness. *It punches to the center of a 24" circle,* comes in a choice of 3 shut heights: 9", 12" or 15" exclusive of bolster plate. Stroke lengths to 3".

OTHER BENCHMASTERS furnished in 2, 5, 8 and 10 ton models in Plain OBI, Back-Geared, Deep Throat, Half Press, Fixed Bed Gap Frame, and Multiple Ram models.

WRITE FOR CATALOG,
prices and recommendations.

benchmaster
World's largest manufacturer of small punch presses and mills.
1835 W. Rosecrans Avenue • Gardena, California
CIRCLE INFORM-A-GRAM KEY NO. 882

SEALED
PRECISION
BALL BEARING
CONSTRUCTION

GATCO
ROTARY BUSHINGS

For DRILLING, CORE DRILLING, ROUGH and FINISHED DRILLING

The inner race of the GATCO bushing rotates with the tool, piloting the tool accurately below or above the work — or both

Eliminates expensive tool construction — Reduces tool wear — Prevents seizure and pilot breakage — Especially adapted where precision is required.

Write for full information and prices

GATCO ROTARY BUSHING CO.
42322 ANN ARBOR RD., PLYMOUTH, MICH.
Dial GLenview 3-2295
CIRCLE INFORM-A-GRAM KEY NO. 884

A Direct-Reading Shop Instrument, the Profilometer, eliminates guesswork when measuring surface roughness. A bulletin tells why it is better not to rely on guesses, especially now with more surfaces per workpiece being tested. "Why Have Horse & Buggy Arguments on Surface Roughness in a Jet Age?" is from Micrometrical Mfg. Co., 345 S. Main St., Ann Arbor, Mich., or — **No. B35.**

For Testing Surface Flatness and checking machine tool bed way alignment, parallelism, or squareness, use the auto-collimator offered in a bulletin. Other applications, as well as mechanical and optical features, are described in this bulletin, available from Opto-Metric Tools, Inc., 137 Varick St., New York 13, or **Circle Inform-A-Gram No. B36.**

"Production Drilling Machinery," a 32-page catalog, gives specifications for standard high-speed sensitive and upright drilling and tapping machines. Descriptions of accessories and attachments are also included. Write The Avey Div'n of The Motch & Merryweather Machinery Co., 1250 E. 222 St., Cleveland 17, or — **B37.**

"How to Get Better Critical Parts at Cost-Saving Prices" presents design, production, and application data on screw machine blanks engineered to provide good tolerances in the manufacture of critical hydraulic pump pistons. Write National Screw Machine Products Assoc., 2860 E. 130 St., Cleveland 20, for your copy of Fact File No. 1, or — **Circle No. B38.**

A Precision Instrument Component Kit Catalog lists a complete line of "breadboard" development kits for mechanical and electro-mechanical "breadboards" for prototype work, test fixture applications, and servo control system applications. Get Catalog 17 from PIC Design Corp., 477 Atlantic Ave., E. Rockaway, L. I., N. Y., or — **Circle No. B39.**

Facilities and Equipment for designing, forming, joining, and finishing aluminum jobbing products on a contract basis, are described in "Alcoa Fabricating Facilities." This equipment can handle exacting custom-engineered jobs or high-volume production work for small or large workpieces. Write Aluminum Co. of America, 739 Alcoa Bldg., Pittsburgh 19, for a copy, or — **B40.**

Your Inform-A-Gram card follows page 84 in this issue.

position or feed it faster

WITH AN AUTOMATIC

Feedall

hopper-load elevating feeder eliminates costly hand operations, saves time and speeds parts flow

SPECIFICATIONS—*Model 3000 Elevating Hopper Feed*

FEED RATE: variable speed drive to match production rate of machine being fed.

WORK RANGE: rolling parts, 1" to 6" in diameter, 1/8" to 2" in length. Sliding parts, 1/8" to 2" in diameter, up to 6" long. Loading height is 62".

CAPACITY: 18 or 25 cu. ft. hopper. Overall floor space is 48" x 52".

DELIVERY ANGLE: 15° rolling parts, 30° sliding parts. 10° elevating angle.

DRIVE: 3/4 hp, 220/440V 60 cycle, three phase motor.

This multi-purpose feeder is just about the most versatile machine ever developed by Feedall. It provides in-process storage; elevates, orients and feeds work-pieces of wide variety in diameter and length. It handles both rolling and sliding parts. Typical are the varied parts shown above, merely suggesting the many versatile uses for this high-production unit.

It's fully automatic. Model 3000 replaces slow, time-wasting hand feed. The combination of magazine-loading and selectable speed permits continuous parts flow at any desired rate. *It's compact.* The "complete-package" feeder is entirely self-contained and is simple to fit into existing facilities. *It's a producer.* Model 3000 has proved its reliability and profitable operation in scores of installations. Construction is rugged; built for multi-million cycle operation.

Useful features of the Model 3000 include: electronic controls for any timing cycle, readily adaptable design to fit many special feeding jobs, portable and simple to re-locate, and adjustable elevating angle for special purposes.

Eliminate hand-feed, save operators and step-up production . . . with a Model 3000 Feedall. Full details are available in latest catalog, complete with estimating data sheet. Write for your copy today. Or if you have a special feeding problem, send us sample parts and brief data. We'll do the rest, promptly.

Feedall *Producers of automatic feeding devices*
FEEDALL, INC., WILLOUGHBY, OHIO

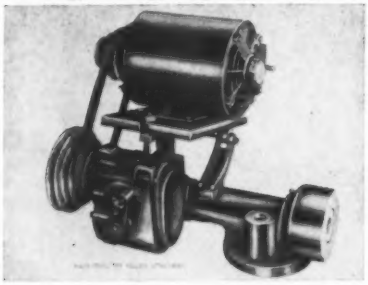
ELEVATING, BLADE, TUMBLE, VIBRATORY FEEDERS • TRANSFER AND ELEVATING CONVEYORS • SPECIAL SELECTOR DEVICES

CIRCLE INFORM-A-GRAM KEY NO. 89

PRODUCTS on PARADE

For more information about the products described here, use POSTAGE-FREE Reader Service Card in this issue.

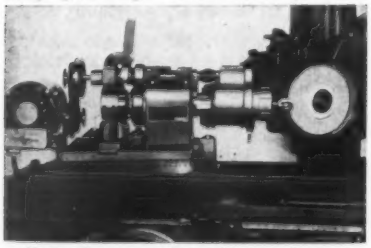
A New Attachment for Mounting on Lathes, milling machines, turret lathes, and boring mills is used for drilling, milling, shaping, boring, and



hexing small or large parts. Model M has a 2" spindle height and capacity for 1" end mill. For information, write Alva Allen Industries, Clinton, Mo., or — **Circle No. A1.**

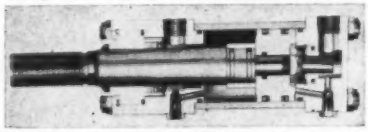
The Deka-Bore Boring Head has an offset feature to compensate for tool grinds, yet is only 2/14" in dia. Model A-1 holds up to ½"-dia quills, permits positive 0.0001" adjustments without backlash, and works horizontally or vertically. Precision Tool Mfg. Co. of Illinois, 1305 S. Laramie Ave., Cicero 50, Ill., or — **Circle Inform-A-Gram No. A2.**

Set Up for Grinding or Reworking of special and standard cutting tools with a Circularity grinding attachment. It provides fast setups for easy grinding of form relief, radial



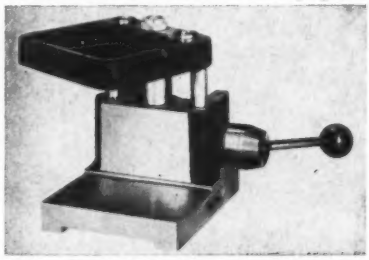
relief, form and radial relief together, tapered cylindrical, and straight cylindrical. Detroit Reamer & Tool Co., 780 W. Maple Rd., P. O. Box 174, Birmingham, Mich., or — **Circle Inform-A-Gram No. A3.**

The "Automation" Lines of Air and Hydraulic Cylinders are designed to "automation standards" to meet the most exacting demands of high speed automatic production. They are highly versatile, fabricated



to give maximum efficiency and long life with minimum maintenance, and rated at 200 psi air operation and 1000 psi hydraulic operation. Bulletins 107 and 108 are available from Ortman-Miller Machine Co., Inc., 21 143 St., Hammond, Ind., or — **Circle Inform-A-Gram No. A4.**

The Lift Swing Drilling Fixture features a top that swings back out of the way, permitting faster loading and easier inspection, and a locking mechanism that locks in any posi-



tion. Use of double top plates permit reaming and drilling stepped holes or drilling closely spaced holes side by side with minimum wall thickness between. Literature is available from Accurate Bushing Co., Garwood, N. J., or — **Circle Inform-A-Gram No. A5.**

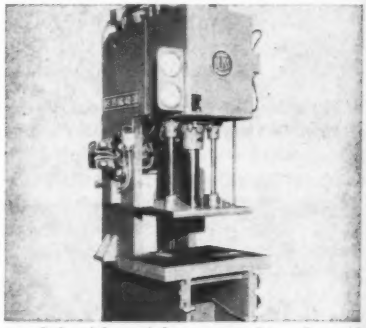
Produce Any Two-Dimensional Straight-Line or irregular-contour shape with speeds up to 50 in/min with the Magnespark profiler. It traces at a pre-set constant surface

speed, thus producing better surface finish as well as giving longer cutting tool life. Pratt & Whitney Co. Inc., W. Hartford 1, Conn., or — **Circle Inform-A-Gram No. A6.**

Extra Length Spade Drill Holders have been added to the Waukesha Cutting Tools line. They will handle

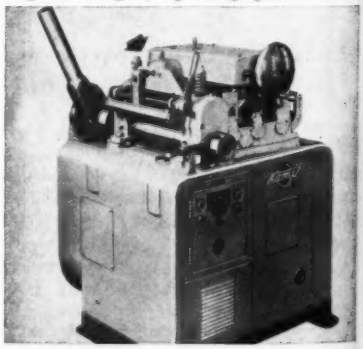
drilling depths from 15" to 25" with a hole diameter from 1" to 5". For information, write Waukesha Cutting Tools, Inc., Waukesha, Wis., or— **Circle Inform-A-Gram No. A7.**

Low Tonage Gap Frame Hydraulic Designs have been added to the Hydro-Dynamic press line by E. W. Bliss Co., 1375 Raff Rd., S.W., Canton 10, Ohio. Illustrated is a 35-ton

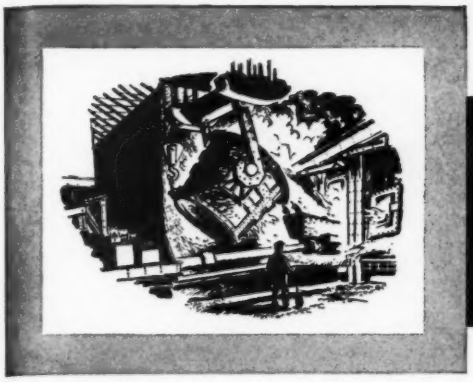


model with quick approach and rapid return speeds of 693 ipm, and a pressing speed of 100 ipm. Contact the company for more information, or—**Circle Inform-A-Gram No. A8.**

Automatic Roll Lifters adapt Littell hydraulic feeders and straighteners to progressive die work. Feeding to length, opening pinch rolls,



and resetting a new cycle is automatically electrically controlled by the press. Get data from F. J. Littell Machine Co., 4101 N. Ravenswood Ave., Chicago 13, or — **Circle No. A9.**



EQUIP FOR THE SIZE OF THE JOB

USE THE PERFECT COMBINATION
For Assured Accuracy
in **MICRO-DRILLING**

SPHINX
HIGH SPEED STEEL MICRO-DRILLS

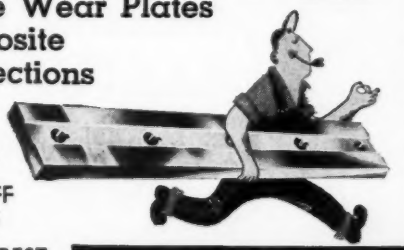
Drills from .0016" to .0591" are stocked in increments of .0004"(.01 mm). From.0610" to .1181" in increments of .0020" (.05 mm). Left hand micro-drills for use on Swiss type automatic screw machines. Short flute center drills. Send for Bulletin "Q" listing complete line of drills or Catalog M listing collets as well as full line of instrument lathes and accessories.
Louis Levin & Son, Inc., 3610 S. Broadway, Los Angeles 7, California.

LEVIN ®
SUPER PRECISION COLLETS

Super precision collets for jewelers type lathes. Ideal for holding micro-drills or other parts where concentricity is important. Available from stock in complete range of sizes from .004" (.1 mm) to 5/16" (8.0 mm).

CIRCLE INFORM-A-GRAM KEY NO. 911

Immediate delivery on **OK**
Bronze Wear Plates
Composite
Die Sections



SHEAR BLADES
CUT-OFF BLADES
WORK-REST BLADES

THE OHIO KNIFE CO.
CINCINNATI 23, OHIO

CIRCLE INFORM-A-GRAM KEY NO. 912

The **HEIMANN MAGNETIC CHIP REMOVER**

THIS HAND IS IN THE CHIPS! Yes, and the chips are *not* in your eyes or hair or ways of machines. The Heimann Magnetic Chip Remover gets chips out of blind holes rapidly, cleanly, safely. It's a lastingly efficient permanent magnet in a knurled aluminum holder. Send it in after chips and it comes out covered with them.

YOU CAN'T AFFORD to be without it! A natural for your tool box or crib. Made 1/8" to 1/2" sizes, at a price to attract. Write now for circular.

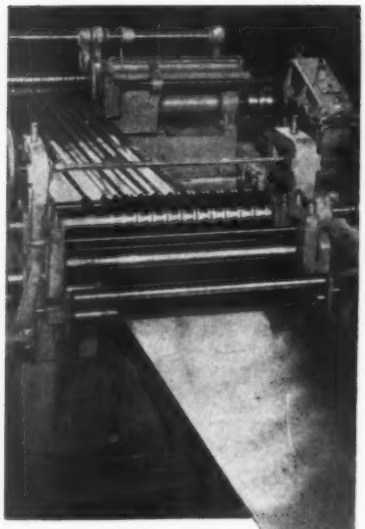
Permanent — Easier
Strong — Convenient
Quicker — Better

HEIMANN MFG. CO., URBANA, OHIO

CIRCLE INFORM-A-GRAM KEY NO. 913

WAIT! Save Money!
DO THAT JOB FASTER AND BETTER WITH A Severance MIDGET MILL!
Ask for a SEVERANCE catalog today! YOU'LL FIND IT DETAILED, WELL ILLUSTRATED, SUGGESTIVE AND INFORMATIVE. IT INCLUDES LOW REGRINDING PRICES.
YES, A SEVERANCE MIDGET MILL MAY WELL SOLVE YOUR PROBLEM AND SAVE YOU MONEY, IF YOU MUST REMOVE GATES, FINS, AND RISERS; BREAK SHARP CORNERS AND EDGES; MACHINE CARBON; FINISH CASTINGS OF ANY MATERIAL; WORK FILLETS, RADII, AND GROOVES; DEBURR OIL HOLES; BLEND WELDED AND ASSEMBLED PARTS; REMOVE FLASH; SMOOTH WELD BEADS; OR ANY OTHER SIMILAR OPERATIONS
MANY STANDARD SHAPES & SIZES TO CHOOSE FROM
SPECIAL SHAPES & SIZES AVAILABLE ON SHORT NOTICE
Severance MIDGET MILL SET NO. 77
SEVERANCE MIDGET MILL SET NO. 77, IS A POPULAR SET OF 1/2" DIAMETER, 1/4" SHANK, HIGH SPEED MIDGET MILLS. MAKES A FINE GET-ACQUAINTED-SET AND WILL COVER A BIG MAJORITY OF YOUR NEEDS FOR THIS TYPE TOOL. LEAFLET NO.651 GIVES DETAILED INFORMATION AND PRICES. ASK FOR IT TODAY!
Severance TOOL INDUSTRIES INC.
730 IOWA AVE. — SAGINAW, MICHIGAN
CARBIDE HAND FILES
REGRINDING
INSIDE DEBURRING CUTTERS
OUTSIDE DEBURRING CUTTERS
HAND DEBURRING CUTTERS
TUBE END DEBURRING CUTTERS
CHATTER-FREE ECONO-SINKS
SPECIAL CUTTERS
MICRO-MILLS & BORE-MILLS
BALL SEAT REAMERS

CIRCLE INFORM-A-GRAM KEY NO. 914



Greater Profit and Operational Flexibility with a YODER SLITTER

Even if you use less than 100 tons of varied strip sizes per month, it will pay you to investigate the savings that are possible through the operation of a Yoder slitter. Savings per ton increase rapidly as coil size and width of strands decrease...so much, that under average operating conditions, a slitter will pay for itself in a few months.

From a small stock of standard mill-width coils, a Yoder slitting line enables you to meet unexpected demands, or to supply "special" width slit strands in a matter of a few hours. This flexible operation increases plant efficiency, resulting in savings of time and money through simplified production planning and greatly reduced strip inventories.

The Yoder line includes slitters of every size and capacity for coil or sheet stock. Send for the all-new, 1958 edition of the Yoder Slitter Book. It is a comprehensive text on the mechanics and economics of slitter operations with time studies, cost analyses, and other valuable data. Write to:

THE YODER COMPANY
5501 Walworth Avenue • Cleveland 2, Ohio

YODER ROTARY SLITTING LINES

CIRCLE INFORM-A-GRAM KEY NO. 921

STYLE AND SIZES FOR ALL MACHINES ON WHICH THREADS ARE CUT

On Brown and Sharpe, and other automatics

INSERT CHASERS SAVE UP TO 33%

Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than $50 you get a dozen sets of ¾—16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime.

FREE: "Unified and American Screw Thread Digest"

THE EASTERN MACHINE SCREW CORPORATION 29-49 Barclay St., New Haven, Conn.

CIRCLE INFORM-A-GRAM KEY NO. 922

PRECISION CASTING-

without size limitation with the SHAW PROCESS Casting Method.

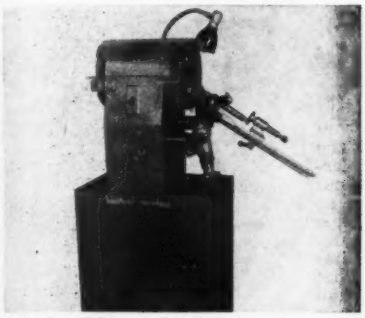
Oversize cavities, fast production schedules, close tolerances—*all three* can be successfully met with Standard's Shaw Process Casting Method. Costs are low when you use this method to produce cavities, cores and hobs.

Write for new illustrated folders on:
MOLDS • BERYLLIUM COPPER • INJECTION MOLDING • FABRICATING MACHINES

STANDARD TOOL COMPANY
216 Hamilton Street, Leominster, Massachusetts

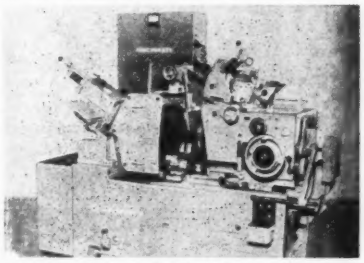
OMNI PRODUCTS CORPORATION—Export Distributors, New York, N.Y.
For less than $50 you get a dozen sets of ¾—16 insert chasers, each set
CIRCLE INFORM-A-GRAM KEY NO. 923

A Drill Grinder has been redesigned to include safety eyeshield, built-in diamond dresser, pushbutton



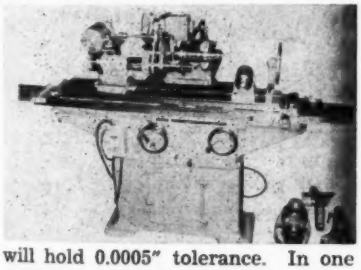
switch with overload protection, and a tool rest for utility grinding. Black Diamond Saw & Machine Works, 129 North Ave., Natick, Mass., or —
Circle Inform-A-Gram No. A10.

Two Improved Centerless Grinders feature grinding wheel trueing controls located with other controls at the left-hand end of the bed. The bed is 5" longer, which gives a great-



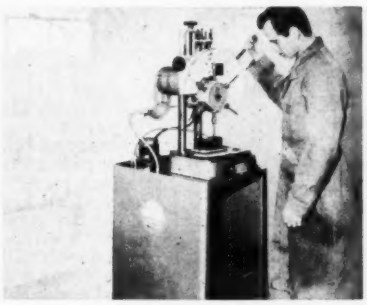
er support area for trueing units, and the throat now takes 13" regulating wheels. For information, write Cincinnati Grinders Inc., Cincinnati 9, or—**Circle Inform-A-Gram No. A11.**

Grind Either New or Used Carbide Throw-Away Tools on a machine which handles any shape tool. It will grind any radius from 0.010", negative and positive rake tools, and

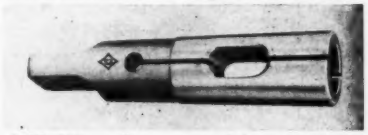


will hold 0.0005" tolerance. In one operation it grinds the periphery and radius of throw-aways. Harvill Machine Co., 618 E. 10 Mile Rd., Hazel Park, Mich., or — **Circle No. A12.**

Perform Six Different Operations on a workpiece without moving it by using a floor model turret drill. The turret is power-indexed, rotates itself, and only the spindle in use is in operation. It machines holes to ¼" in steel. Burg Tool Mfg. Co., Inc., 13226 S. Figueroa St., Gardena, Calif., or—**Circle Inform-A-Gram No. A13.**



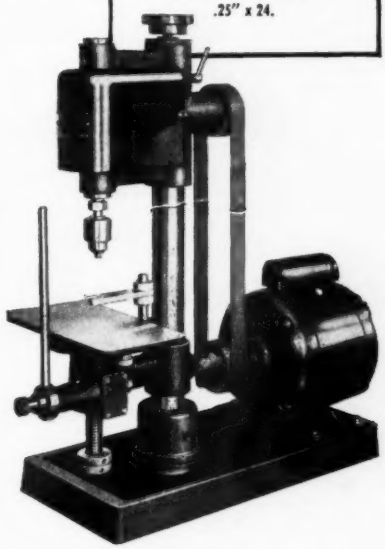
Reduce Drilling Costs by using split sleeves with straight shank tanged drills. High concentricity between sleeve hole and body gives less run-out at drill point for longer



drill life. On many jobs requiring extra length drills, use of these split sleeves eliminates the need for special tools. The Cleveland Twist Drill Co., 1242 E. 49 St., Cleveland, or —
Circle Inform-A-Gram No. A14.

Now *Precision* TAPPING OF THIN AND BRITTLE MATERIALS

Hamilton Super Sensitive, Small-Hole, Precision Tapping Machine.
Capacity — .034" x 120 to .25" x 24.



Recent design change provides a simple homing device as a standard component of the

HAMILTON SUPER SENSITIVE, SMALL-HOLE PRECISION TAPPING MACHINE

and makes routine of such problem work as the tapping of precision holes in thin metal sheets or in brittle plastics. Even improves performance in the tapping of blind holes!

YOU

will want full information about this important development!

WE WILL FURNISH IT

FREE

ask for
BULLETIN No. 2463

ADDRESS

THE HAMILTON TOOL COMPANY
832 South Ninth Street
HAMILTON, OHIO

IT'S A Hamilton Tool
USE IT WITH CONFIDENCE

2463

CIRCLE INFORM-A-GRAM KEY NO. 93

Prompt Service on RAYMOND Chrome Vanadium

DIE SPRINGS

Stock or Special Sizes
Medium, Medium-Heavy, Heavy Duty

Distributed by leading die set manufacturers

5833

Wide variety of hole and rod sizes, lengths, deflections. Increased fatigue life. Reduced down time. *Write for specifications and price list, and name of nearest distributor.*

Raymond Manufacturing Division
Associated Spring Corporation
Corry, Pennsylvania

CIRCLE INFORM-A-GRAM KEY NO. 941

Precision Tapping

by hand or machine with

DAHLSTROM TAP GUIDE

saves countless hours by preventing broken taps.

A low-cost Dahlstrom Tap Guide provides the accuracy and close tolerances of larger machines costing many times as much. Tap breakage, a major expense in many shops, is virtually eliminated with a Dahlstrom Tap Guide because metal material is always held straight and square. Light enough for portability, yet it can be bolted to wall or post for permanent installation.

Machine Tapping

The spindle top is centerbored to fit the tail stock of a lathe. Simply pull out for lathe use. The same spindle can also be used as a tap extension for reaching hard-to-get-at places. Tap Guide is furnished with nine adaptor sizes: 8-32; 10-24; ¼", 5/16", ⅜", 7/16", ½", ⅝", and ¾". *Write for bulletin.*

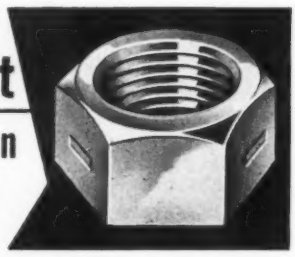
$59.50 F. O. B. Factory

BRANCH MFG. CO.
16 Olson Drive, North Branch, Minn.

CIRCLE INFORM-A-GRAM KEY NO. 943

NEW Centerlock Nut

saves production time...speeds application



Here is a new low cost lock nut that can be applied from either end, double chamfered, with the locking feature in the center. The greater speed in application of these Centerlock Nuts can make definite savings in production time and provide low cost fastening. Ideal for customer assembled products.

The New Centerlock...

● Can be automatically fed ● Will lock wherever turned on bolt ● Does not depend on friction against work for locking ● Can be applied from either end ● Will not damage bolt threads ● Available in steel, Brass, aluminum or stainless on special order ● Offered in finished series, double chamfered from ¼" thru ⅞" in fine or coarse threads. Machine screw sizes #8, #10, and #12 also available. Heavy series made to special order only ● Also in closed and open end acorn type ● Large inventories carried for immediate shipment. 119

Write for samples and NEW CATALOG today

GRIP NUT COMPANY
107 Maple Ave. South Whitley, Indiana

CIRCLE INFORM-A-GRAM KEY NO. 942

1-PIECE stamping

eliminates 3-PIECE assembly...SAVES 43%

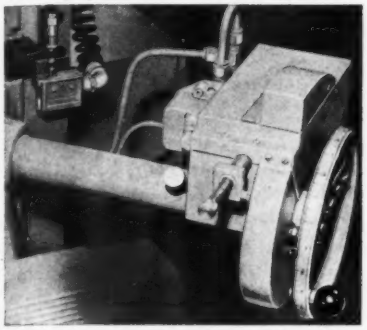
REDESIGNING this pawl assembly to a one-piece stamping gave the customer exact duplication plus lower cost. Formerly fabricated at $1.00 each, the first 100 stampings cost 57¢ each. The next 100 pieces will show a savings of 95%.

Got a fabrication problem? Chances are it can be solved with short-run stampings using the D-R method of utilizing temporary tooling. Send your print and/or sample, plus quantity, for prompt quotation. No obligation.

DAYTON ROGERS *Manufacturing Company*

MINNEAPOLIS 7B, MINNESOTA
CIRCLE INFORM-A-GRAM KEY NO. 944

Automatically Grind Flats, Slots, Shoulders, and Shapes to close tolerances on hydraulic-powered Hydrabrasive precision surface grinders.



Automatic downfeed can be set to operate to pre-set tolerances, and the unit can be set for either 1, 2, or 3 spark-out passes before automatically shutting off. Abrasive Machine Tool Co., Dexter Rd., E. Providence, or—**Circle Inform-A-Gram No. A15.**

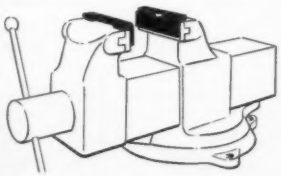
Eliminate Insert Shifting with the improved Kendex profiling tools with two-piece shim. This feature provides a positive seat and a solid

backup of solid carbide for the insert. These tools come in a range of sizes and styles. For data, write Kennametal Inc., Latrobe, Pa., or —
Circle Inform-A-Gram No. A16.

Torc-Pac OBI Presses, in capacities of 22, 32, and 45 tons, have bronze clutch and brake plates that operate in an oil bath which lubricates and cuts down wear.

Clearing Machine Corp., Div'n of U. S. Industries, Inc., 6201 W. 63rd St., Chicago 38, will supply descriptive literature.
Circle No. A17.

Protect Clamped Work from scratches or gouges with a copper-faced magnetic vise-jaw liner. The magnetic feature eliminates all bending, riveting, or clamping when securing liners. They stay put when jaws are opened or closed. Severance Tool Industries Inc., 730 Iowa St., Saginaw, Mich., or — **Circle No. A18.**



No Bushings Are Needed on these universal V-type toolholders. A clamping block holds drill or reamer in the "V" without galling tool shanks. The precision cast alloy steel holders have hardened and ground bodies, mating head surfaces, and shanks which assure easy adjustment and quick setup. Boyar-Schultz Corp., 2000 S. 25 Ave., Broadview, Ill., or — **Circle No. A19.**

PORTELVATOR®

The Handy HAMILTON Portable, Elevating Table

A PORTABLE HEIGHT-ADJUSTABLE TABLE
- TRUCK
- WORK BENCH

for
- DIE TRANSFER
- MACHINE FEEDING
- ASSEMBLY AT BEST HEIGHT IN BEST LIGHT

LIFTING
- LOWERING
- TRANSPORT of SHEETS, PLATES, BARS, TUBES, PIPES, TOOLS, DIES, FIXTURES
- ALL COMPACT HEAVY LOADS

UNOBSTRUCTED PERIMETER
- WORK FROM ANY SIDE

MORE SERVICE for LESS MONEY than ANY Other Unit of Equipment

43 table surfaces
point support

Recent changes and additions to the line provide greater capacities, new flexibility, *many bonus features*.

Write for NEW, FREE Bulletin P-5604

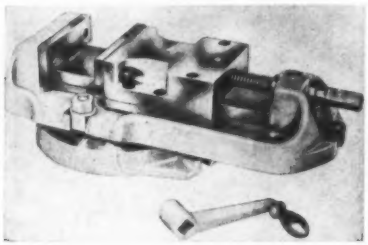
Address THE HAMILTON TOOL COMPANY,
832 South Ninth Street, Hamilton, Ohio

IT'S A Hamilton Tool
USE IT WITH CONFIDENCE

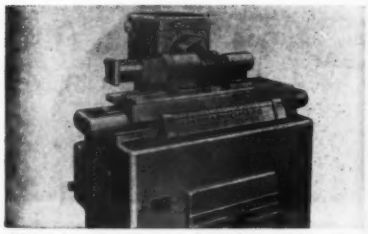
5604

CIRCLE INFORM-A-GRAM KEY NO. 95

Big Opening Capacity for accurate machining for rough or finished workpieces is a feature of a line of trough vises. Extra rigidity is provided by center hold-down screws, "square lock" way construction, and wide table mountings. Sizes from 4" to 8" are available. The Skinner Chuck Co., Dept V10, New Britain, Conn., or — **Circle No. A20.**

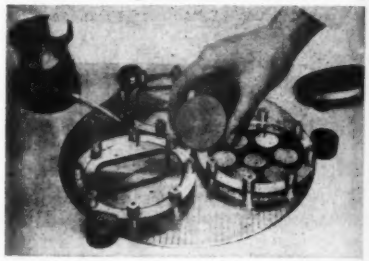


The Michigan Hard-Gear Finishing Method uses relatively low-cost abrasive-impregnated gear-like tools. Rotation of these "throw-away" abrasive tools with the work gear in a cross axes relationship gets a smooth, more quiet finish. Up to 12" dia gears can be finished on the Model



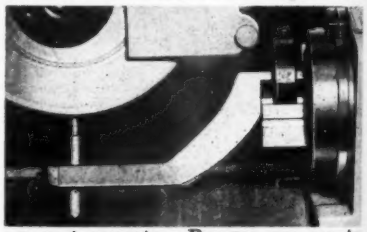
999 gear finisher using these abrasive tools. Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, or — **Circle Inform-A-Gram No. A21.**

A 24" Semi-Automatic Lapping Machine delivers flatness to less than one light band, and a surface finish as low as 1 micro-inch rms. Designed for production lapping of



small parts, the machine will handle parts that will fit in the 8⅞" OD trueing rings. Taft-Peirce Mfg. Co., Woonsocket, R. I., or — **No. A22.**

A New Radius Dressing Arm attachment for the Grind-All fixture quickly converts the fixture into an accurate and economical radius dresser. It is said to be easy to set



up and operate. Ranges are up to 2" convex radius, 4" concave radius, and 10" wheel. For information, write Harig Mfg. Corp., 5757 W. Howard St., Chicago, or — **No. A23.**

A Hydraulic Cylinder for operating pressures of 1000, 2000, and 3000 psi, the Spacemaker, offers cushioned or non-cushioned cylinder, forged steel heads, and self-aligning

adjustable-cushion high pressure piston ring construction with three types of oversized ports and extra long rod guide bearing. For data, write The Tomkins-Johnson Co., Jackson, Mich. **Circle No. A24.**

ACE
Ground-from-the-Solid
DRILLS

Whatever you want to drill – steel, cast iron, or non-ferrous materials – you'll find there's an ACE "Ground-from-the-Solid" Drill that's pointed *right* for the job! Drills made of top quality, uniformly hardened high speed steel –carbide tipped and solid carbide, too. Drills ground by the ACE-originated method that gives them more highly polished flutes and keener, stronger, longer-lasting cutting edges. Drills that are finished with on center points, correct point angle and lip relief to "bite" in fast, produce cleaner, more accurate holes. And they're available *now* through your local distributor – *so ask for them by name!*

Call your local distributor or write direct today for the latest Ace Drill Catalog and current Net Price Schedule.

ACE DRILL
ADRIAN, MICHIGAN
Originators of Ground-from-the-Solid High Speed Steel Drills

Taper Length Drills	Stub Length Drills	"Hi-Brinell" Drills	Carbide Tipped Drills
12"-18" Longboy Drills	Heavy Duty Drills	Solid Carbide Drills	Step and Subland Drills
Hardened H.S.S. Blanks	Slow Spiral Drills	Taper Shank Drills	"L" and "M" Plastic Drills
General Purpose Drills	Fast Spiral Drills	Chucking Reamers	Drill Length Reamers

CIRCLE INFORM-A-GRAM KEY NO. 96

Punches and Dies

...for foot and power presses

Standard Punches and Dies of all sizes and shapes in stock—or made promptly to order. Also Adaptors and Die Shoes to convert your press. For power, foot or hand operation.

Round, square, rectangular, slotting, notching, louvre, angle, multiple, knock-out and other shapes. Precision made from high grade tool steel. More than 25,000 sets in stock to choose from.

26 *years of serving your punch and die requirements*

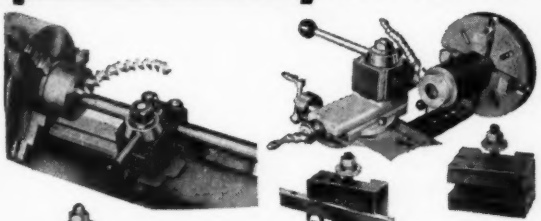
SEND FOR FREE CATALOG No. 157 AF, illustrating our standard punches and dies and complete line of modern sheet metal fabricating equipment. **NET PRICES SHOWN.**

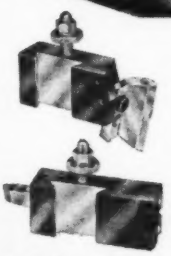
WARD Machinery Co. 564 West Washington **Chicago 6**

CIRCLE INFORM-A-GRAM KEY NO. 971

YOUR LATHES "TURN OUT" BIGGER PROFITS

WITH **ALORIS** QUICK CHANGE **TOOL POSTS & TOOL HOLDERS**





Change tools instantly—for turning, facing, drilling, boring, threading, knurling, cutting off or any operation.

- Maximum Repetitive Accuracy Assured
- No Shims . . . No Time Wasted
- Unlimited Versatility
- Saves 90% Set-up Time, 50% Production Time
- Greater Rigidity
- Leading Lathe Mfrs. Recommend It
- Sizes to Fit Every Lathe
- Unconditionally Guaranteed

NEW! Aloris Holder for Carbide Triangular Inserts.

Greater rigidity, versatility, efficiency & economy

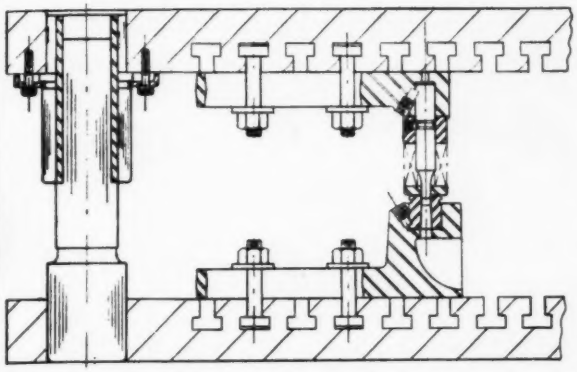
Write For Catalog & Price List

ALORIS TOOL CO., INC. 419 Getty Avenue Clifton, New Jersey

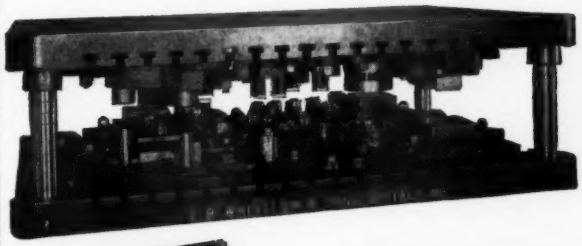
CIRCLE INFORM-A-GRAM KEY NO. 972

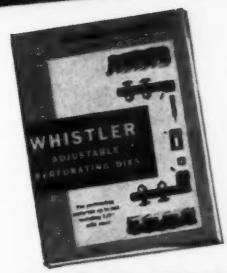
ADJUSTABLE DIES by WHISTLER

• Operate like a single purpose die • Easy to set-up and make changes • Interchangeable and re-usable parts always ready for a new job • Reduce die costs to a new low • Pierce holes in any desired arrangement of shapes and sizes • Precision piercing of materials to ¼" thick steel.



Above: Sectional drawing of a Whistler adjustable punch and die unit assembled in T-slot die set. **Below:** A completely assembled Whistler adjustable die ready for the press.





YOU NEED THIS CATALOG

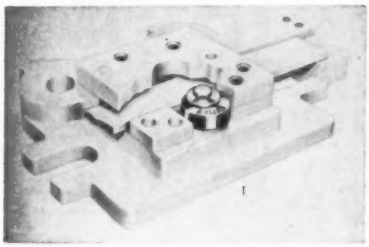
to see for yourself in dollars and cents what this adjustable die making method can do for your plant. Send for it right now...without obligation.

S. B. WHISTLER & SONS, INC.
748 Military Road, Buffalo 23, N. Y.

ADJUSTABLE, MAGNETIC and CUSTOM DIES FOR ALL INDUSTRY
Direct Factory Representatives Located in Principal Industrial Areas

CIRCLE INFORM-A-GRAM KEY NO. 973

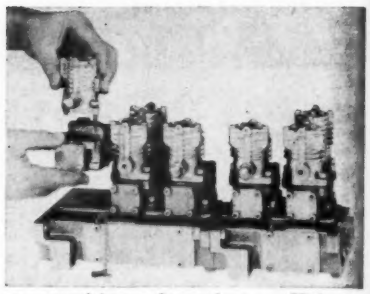
A Stock Pusher, used for positive alignment of stock in dies and fixtures, can be used in all types of fixtures and machinery for handling sheet metal as thin as 0.010" or thin-



walled parts. They're especially good with progressive dies and are easily removed for die sharpening. Vlier Engineering Corp., 8900 Santa Monica Blvd., Los Angeles 46.

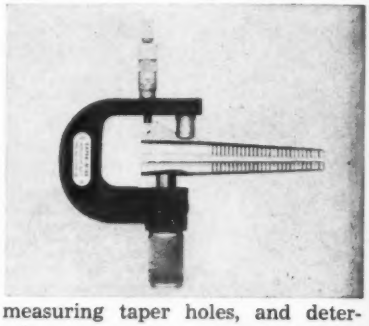
Circle Inform-A-Gram No. A25.

Plug-In Type Manifolds, designed for use with Speed King ¼" 4-way plug-in control valves, feature built-in plugs and connectors which complete electrical connections automatically. The manifolds are said to reduce original installation and in-service maintenance costs as well



as machine downtime. Valvair Corp., 454 Morgan Ave., Akron, Ohio, or — **Circle No. A26.**

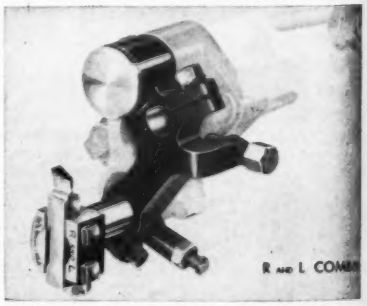
An Internal Taper Micrometer has been introduced by Taper Micrometer Corp., 100 Grove St., Worcester, Mass. It eliminates guesswork when



measuring taper holes, and determines accurate measurement to ±0.0002". For information write to the company, or — **Circle No. A27.**

Miniature Fluted Reamers are ideally suited to the production of miniature products. Diameters ranging from wire gage sizes 0.0135 through 0.0390, from ¾" to 1⅝" are available. They are ground from the solid and provided with end relief. Lavallee & Ide, Inc., Chicopee, Mass., or—**Circle Inform-A-Gram No. A28.**

Versatility is a feature of the turning tool with the swing tool attachment for right- or left-hand cutting. The device is used on turret lathes



or screw machines for straight, taper, or irregular turning when cross-slide tools are in use in other operations. R and L Tools, 1825 Bristol St., Philadelphia 40, or — **Circle No. A29.**

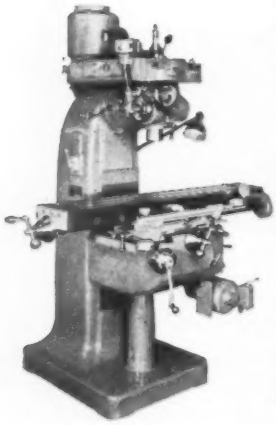
Produce MORE... Produce it BETTER!

ON THESE IMPROVED ECONOMICAL

INDEX VERTICAL MILLS

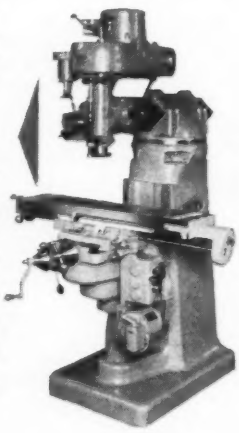
Super "55" MILL

1½ HP Head or optional 2 HP with continuous duty motor gives 50% or more capacity . . . More rigidity, more accuracy . . . Increased horse power and dynamically balanced Cast Iron Pulleys and Drive System afford improved production capacity . . . More weight in the column, heavier ribbed column, heavier knee, heavier saddle.



Unique square design of overarm affords more rigidity, greater accuracy . . . Provides extra range and capacity . . . More power at the cutter. No adjustment required on overarm and head after use . . . No need to re-indicate head after moving overarm . . . Speed range with nine changes makes possible the use of high speed or carbide tipped cutters to best advantage.

"45" MILL

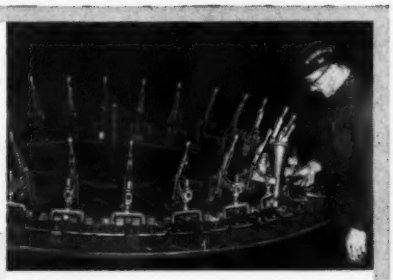


INDEX MACHINE CO.

541 N. MECHANIC STREET JACKSON, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 98

CLAMP QUICK...
HOLD TIGHT...
RELEASE FAST...



KNU-VISE CLAMPS AT GAR WOOD INDUSTRIES, INC.

One of the biggest problems Gar Wood has in gear welding is fast, positive clamping of materials with large variations in thicknesses. Gar Wood chose Knu-Vise "cam action" type clamps for top production and rock-bottom costs. There are 24 clamps to a fixture—with loading and unloading as fast as a man can pull the clamp handles. The work is held rigidly to keep quality high and to reduce rejects.

Whenever you need fast, positive clamping action on jigs and fixtures, or anywhere, you can find a Knu-Vise clamp that will do the work fast and easily. There are more than 150 types of Knu-Vise clamps and pliers designed to do almost any holding job. Every one is a ruggedly built production tool made to last. They are hand or air operated. Write today for more information.

Manufacturers of over 150 models of manually and air-operated clamps and pliers

KNU-VISE PRODUCTS | LAPEER MANUFACTURING CO.

3064 DAVISON ROAD
LAPEER, MICHIGAN

WESTERN DIV.: PECK and LEWIS CORPORATION
4436 Long Beach Ave., Los Angeles 58, Calif., ADams 3-7146
CANADIAN DIV.: HIGGINSON EQUIP. SALES LTD.
1131 Pettit Road, Burlington, Ontario

CIRCLE INFORM-A-GRAM KEY NO. 991

SCHERR
PRECISION MEASURING TOOLS

NON-ROTATING SPINDLE BLADE TYPE MICROMETER HEAD

to be built into fixtures, machine tools, delicate instruments and cross-slides.

NON-ROTATING SPINDLE BLADE TYPE MICROMETERS

For Measuring of narrow depth grooves, slots, keyways, splines, square threads, recesses and similar hard-to-measure surfaces.

BLADE THICKNESS .030"
GAGING DEPTHS TO ¼"
Available Carbide-tipped
Spindle and Anvil Blades are hardened, ground and lapped to contact fit

Graduated in .001"
Ranges: 0-1", 1-2", 1½-2½", 2½-3½" 3½-4½" and others

Mandrel Type MICROMETER Sets
with TUBULAR Frame for • EXTRA STRENGTH • LIGHT WEIGHT

Each Set has a range of 6" and is equipped with setting Standards & mandrels in finished wooden case
Available from 6" to 96"
Light Weight Frames For Extra Large Sizes

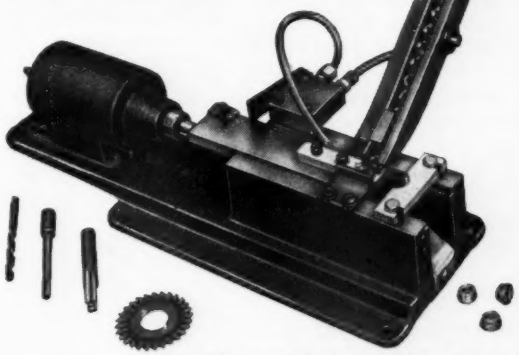
Sold thru Tool Supply Houses WRITE FOR ILLUSTRATED FOLDER

GEO. SCHERR CO., INC.
200-T LAFAYETTE ST. • NEW YORK 12, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 992

More per hour with MEAD
WORK FEEDERS

Feed work fast to drill, tap, broach, mill. Delivers, holds, ejects stampings, castings, screw machine parts up to 3"—thousands per hour. Combines with MEAD Timers and Drill Press Feeds for easy, cost-saving automation.



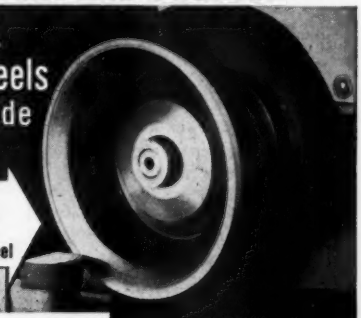
Send for new Air Power catalog today!
(See Thomas' Register for nearest distributor's address, phone number.)

MEAD SPECIALTIES COMPANY
4114 N. Knox Ave., Dept. HA-88, Chicago 41, Ill.
PATHFINDER IN AIR POWER AUTOMATION

CIRCLE INFORM-A-GRAM KEY NO. 993

FOR FASTER GRINDING at LOWER COST

USE A.I.T. Diamond Wheels for all Carbide Grinding



RESIN B-60 Cup Type Diamond Wheel

The exclusive B-60 Bond used in A.I.T. bonded diamond wheels has been field tested in over 400 plants. We can *prove* these superior advantages to you in YOUR plant:

- Faster grinding
- Up to 40% longer wheel life
- One grit size wheel can be used to hog and finish—for extra savings.
- Wheel grinds cooler—does not fracture carbide
- Corners stay sharper longer
- No re-dressing of diamond surface
- NEW BACKING dissipates heat faster
- No down-time for dressing inside body section

Write today for new, FREE catalog and prices

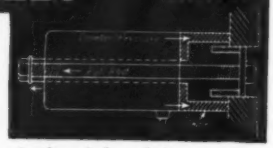
A.I.T. Diamond Tool Co.
8217 N. KIMBALL AVE.
SKOKIE, ILLINOIS

CIRCLE INFORM-A-GRAM KEY NO. 994

PULL HYDRAULICALLY AND SAVE TIME EFFORT MONEY

THE STAR CENTER HOLE RAM eliminates need for cumbersome auxiliary rigging on many otherwise tedious, time-consuming jobs. Works in congested areas — anywhere and in any direction.

Controlled by a hydraulic pump, it pulls out shafts, pistons, pinions, bushings, cylinder liners; replaces gears, wheels, propellers; tensions cables and rods for prestressed concrete. Also used as jack for lifting, pushing, or pressing.



A threaded rod inserted through center hole is shown pulling out bushing.

Ask for Catalog No. 555

Capacities:
30, 60, 100, 150, 200 Tons

Special engineering counsel and proposals cheerfully submitted on request

Representative areas available.

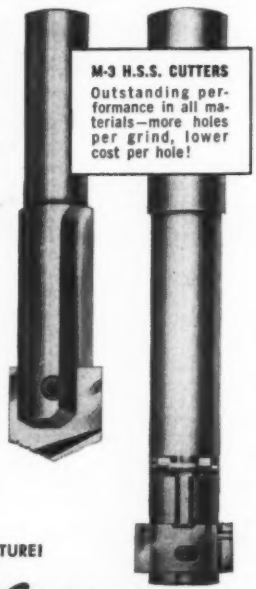
STAR JACK CO., INC.
420 LEXINGTON AVE., DEPT. T&P, N.Y.C. 17.
PLANT: RIVER GROVE, ILLINOIS

CIRCLE INFORM-A-GRAM KEY NO. 1001

New Clark TOOLS SOLVE HOLE MAKING PROBLEMS

CLARK SPADE DRILLS
for lower cost per hole!
Easily reground to smaller diameters. Shanks drilled for coolant circulation. Straight or Morse tapers. Standard sizes 1 1/16" to 5", other sizes on order. Prompt delivery!

CLARK adjustable FINISHING & ROUGHING BARS with new CAM LOCK
Free floating action, instant blade removal without destroying the set-up. Sizes: Finishing 5/8" to 6"; Roughing 1" to 6". Straight shank or Morse tapers. Other sizes on order.



M-3 H.S.S. CUTTERS
Outstanding performance in all materials—more holes per grind, lower cost per hole!

WRITE FOR LITERATURE!

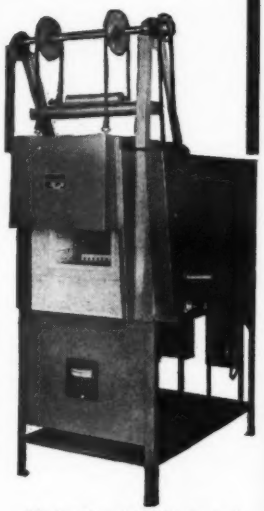
Robert H. Clark Company
9330 Santa Monica Blvd., Beverly Hills, California

CIRCLE INFORM-A-GRAM KEY NO. 1002

Designed for Maximum Efficiency
Built in 28 Sizes

HUPPERT Floor Model FURNACES

- Continuous operation to 1850° F. — intermittent to 1950° F. — for 2300° F. on special order.
- Complete with indicating electronic controller.
- Tight-sealing, wedge-type door.
- Standard for 220 V. AC, single or 3 phase operation — 110 V. or 440 V. on special order.
- Multi-insulation for maximum efficiency.



Request literature on complete line of Huppert Furnaces

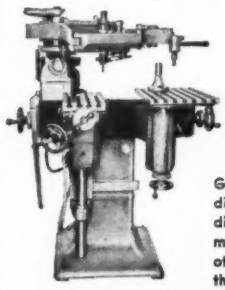
Model No. 16 Illustrated
Inside Dimensions
12" W. x 8" H. x 18" D.
$1050.00 complete

K. H. HUPPERT CO.
Manufacturers of Electric Furnaces and Ovens
6820 Cottage Grove Ave., Chicago 37, Illinois

CIRCLE INFORM-A-GRAM KEY NO. 1003

ALEXANDER DIE-SINKERS

for 2 or 3 dimensional work



Latest model, No. 3A for molds and dies up to 1000 lbs. Ratios from 1.5:1 to 10:1, 14 spindle speeds from 475 to 9500 rpm, cutters up to 3/8" dia. Two smaller sizes, 1A and 2A.

Get a close look at Alexander engravers, die-sinkers, and cutter grinders — optical dividing head, centering and cutter grinder microscopes, cylinder roller attachments and other accessories. Write for catalog B on these quality, British machines.

J. ARTHUR DEAKIN & SON
150-28 HILLSIDE AVE.
JAMAICA 32, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 1004

Mold your own LEAD HAMMERS

Here's the inexpensive, fast way of molding and remolding your own lead hammers with this COOK mold and ladle. It produces hammers that can "take it" Simple to operate.

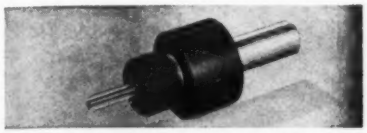
Write for circular and prices

LAWRENCE H. COOK, INC.
68 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

CIRCLE INFORM-A-GRAM KEY NO. 1005

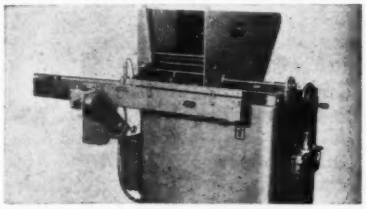
The Inform-A-Gram card which follows page 84 is for your convenience in making inquiries about advertised Products and Editorial items.

A Releasing Tap Chuck is simple and compact, and without springs, cams, or pawls to break or wear. Screws or sleeves are not needed.



The collets are interchangeable, and can be used for right- or left-hand tapping without adjustment. Releasing thread die holders are also available from Universal Engineering Co., Frankenmuth, Mich., or — **Circle Inform-A-Gram No. A30.**

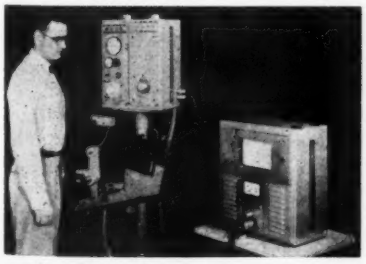
Replace Hand Feeding on centerless grinders and milling machines using a fully automatic bar feeder that handles parts 6" to 31" long and up to 2" in dia. The 1700 C feeder



has a belt speed variable from 5 to 20 fpm, and a hand wheel to adjust feed hopper. For information, write Feedall, Inc., 38399 Pelton Rd., Willoughby, Ohio, or — **Circle No. A31.**

Straight-Shank, Two-Diameter Drills range from ¼" to 1" dia with combinations available for simultaneous drilling-chamfering, drilling-countersinking, drilling-counterboring, or drilling-drilling cavities. All stocked sizes are pre-finished, machined, hardened, and ready to be finished to exact dimensions as desired. Mohawk Tools, Inc., Montplier, Ohio, or — **Circle No. A32.**

The Portable Sheffield Autometrolog Computer and Recorder provides a permanent printed record of average size and size range of a group of parts being gaged. In this way a

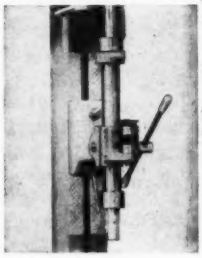


machine's performance as well as tool performance, repeatability, and need of maintenance can be checked. The Sheffield Corp., Dayton 1, Ohio, or—**Circle Inform-A-Gram No. A33.**

An Adjustable Multi-Spindle Head has a bolt which circles up to 23" dia, allowing almost any hole pattern within a given circle to be drilled or tapped. Heads hold 2 to 10 spindles in 7", 10½", 12½", and 15½" sizes.

The spindles are driven by a crank-type drive shaft, eliminating bulky gear clusters. Zagar Inc., 23894 Lakeland Blvd., Cleveland 23, or **Circle No. A34.**

For Multiple Drilling Operations requiring different depths but performed on one spindle, use the Edlund turret depth stop. It has four positions that can be set for a predetermined depth, and by manually rotating to its number position, it can be repeated accurately. Edlund Machinery Co., 50 Huntington St., Cortland, N. Y., or — **Circle No. A35.**



ONLY

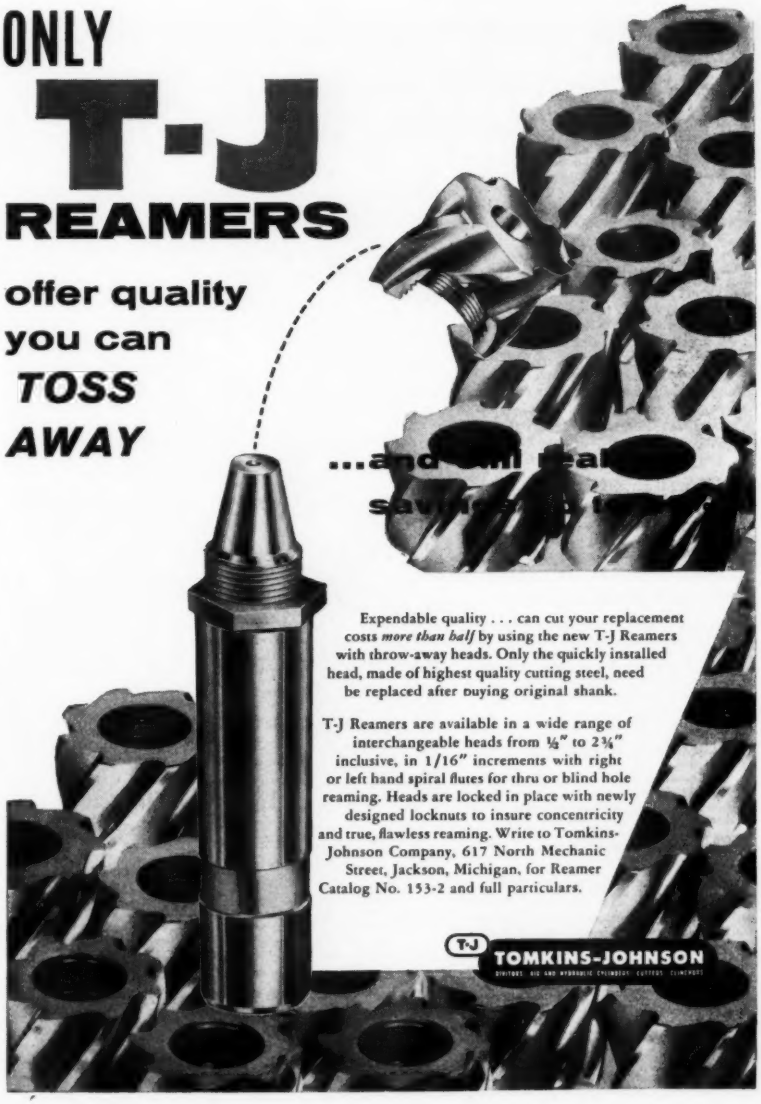
T-J

REAMERS

offer quality you can TOSS AWAY

...and [illegible]

Savi[illegible]



Expendable quality . . . can cut your replacement costs *more than half* by using the new T-J Reamers with throw-away heads. Only the quickly installed head, made of highest quality cutting steel, need be replaced after buying original shank.

T-J Reamers are available in a wide range of interchangeable heads from ½" to 2¾" inclusive, in 1/16" increments with right or left hand spiral flutes for thru or blind hole reaming. Heads are locked in place with newly designed locknuts to insure concentricity and true, flawless reaming. Write to Tomkins-Johnson Company, 617 North Mechanic Street, Jackson, Michigan, for Reamer Catalog No. 153-2 and full particulars.

T-J TOMKINS-JOHNSON

CIRCLE INFORM-A-GRAM KEY NO. 101

The Cross Arm Bar Table Assembly is a completely assembled table, ready for mounting opposed heads for a variety of production machining work. It's easy to set up and ideal with standard drilling and tapping units for versatile operations. The Dumore Co., 1300 17th St., Racine, Wis., or — **Circle Inform-A-Gram No. A36.**

Super Compar-It Gaging Head features constant measuring pressure and practically frictionless movement of all moving parts. It checks directly to 0.00002" with a vertical capacity of 4". Ideal for working in close quarters, the instrument has a sapphire-tipped contact point. George Scherr Co., Inc., 200 Lafayette St., New York 12, or — **Circle Inform-A-Gram No. A37.**

5 Basic Reasons why
MARVEL HACK SAWS
CUT-OFF MORE ACCURATELY...

The consistently accurate performance of MARVEL Heavy Duty Hack Saws is no accident. MARVEL engineers knew, many years ago, that to produce and maintain accurate cutting-off, a hack saw must be designed and built like a fine machine tool.

Some of the basic design principles built into the modern MARVEL Hack Sawing System that makes it the most accurate cutting-off method you can use are:

1. V-Way Design...Greater Rigidity

Upright and Saddle are precision machined and fitted to form a rigid, integral unit capable of withstanding any cutting load with no deflection or side movement.

2. Anti-Friction Bearing Construction

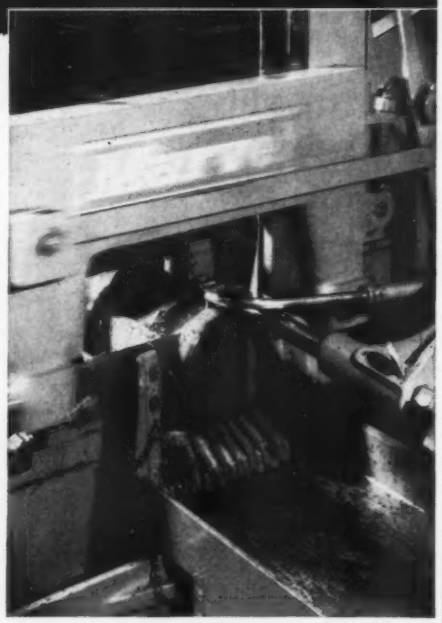
Anti-friction ball or roller bearings are used at all load carrying points. Even the strongly braced saw frame reciprocates on heavy duty, fully enclosed preloaded ball bearings which provide permanent, frictionless rigidity and true-running, straight line cutting strokes.

3. Minimum Blade Frame Reach

Close-coupled design and crank lever action of MARVEL Saws keeps the saw frame and blade reach very short in relation to the vertical V-ways on which the unit is mounted. This insures optimum rigidity, even under the most severe operating conditions.

4. Positive Relief Blade Lift

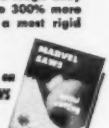
On the return stroke, positive relief lift raises the blade to provide proper and "cushioned" load-in on the next cutting stroke. This prolongs blade sharpness, life and accuracy.



5. Rigid Cutting Tool

Cutting-off accuracy requires a rigidly held, relatively short cutting tool. MARVEL Unbreakable High-Speed-Edge Hack Saw Blades, which combine a narrow high speed steel cutting edge permanently welded to a tough alloy steel body, can be tensioned from 200% to 300% more taut than ordinary blades. This provides a most rigid cutting edge.

Write for the MARVEL Catalog and the complete story on MARVEL METAL CUTTING SAWS



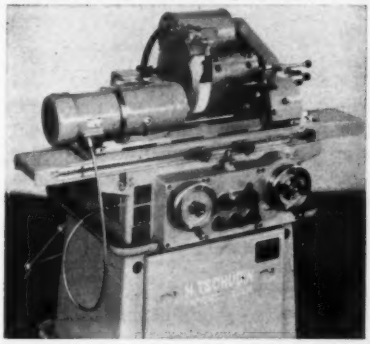
PS-1305

MARVEL Metal Cutting SAWS
Better Machines-Better Blades

ARMSTRONG-BLUM MFG. CO.
5700 W. BLOOMINGDALE AVE., CHICAGO 39, ILL.

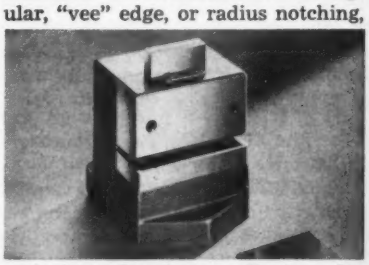
CIRCLE INFORM-A-GRAM KEY NO. 102

A New Hydraulic Cylindrical Grinding Machine, for production and short-run grinding where rapid change of setting is important, features excellent precision, interchangeability of components, one



lever control of movements, and two in-feed speeds. Special equipment on Model HTG 400 includes internal grinding headstock, trueing and profiling devices, and collet operating attachment. Alina Corp., 122 E. 2nd St., Mineola, L. I., N. Y., or — **Circle Inform-A-Gram No. A38.**

Standard Notching Units for notching up to ⅛" mild steel sheet materials are available for rectangular, "vee" edge, or radius notching,



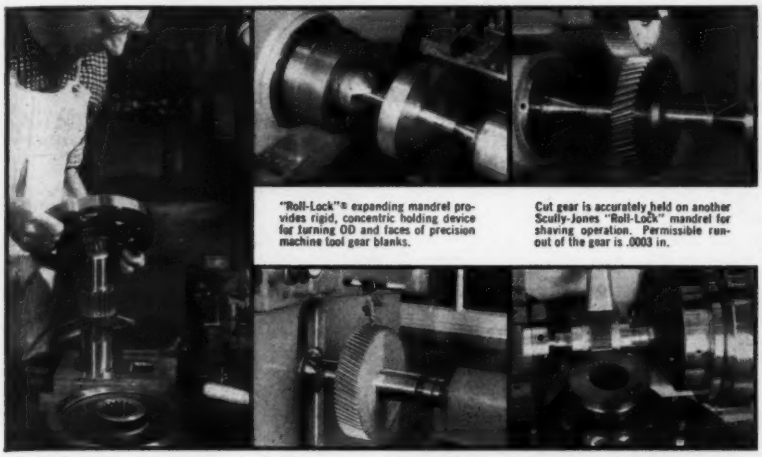
or in irregular shapes. Rectangular sizes ranging from 1½" x 1" to 3" x 8" are stock items. Get information from Wales-Strippit, Inc., 212 S. Buell Rd., Akron, N. Y., or — **A39.**

Use a New Dual-Chucking Cylinder-Operated Holding Fixture on high-output automated production equipment. It can be used individually or mounted in groups on a

rotating worktable to provide simultaneous chucking of two identical parts. Clamping jaws set at a 45° angle permit horizontal and vertical machining without rechucking. The S-P Mfg. Corp., 30201 Aurora Rd., Solon, Ohio, or — **Circle No. A40.**

New ways to hold gear blanks for precision machining and inspection

Easy-loading Scully-Jones arbors and mandrels provide rigid and accurate centering fit



"Roll-Lock"® expanding mandrel provides rigid, concentric holding device for turning OD and faces of precision machine tool gear blanks.

Cut gear is accurately held on another Scully-Jones "Roll-Lock" mandrel for shaving operation. Permissible runout of the gear is .0003 in.

Splined bore easily slips over pins on Pin-Cam mandrel. Slight rotation of blank forces pins into line contact with splines near pitch line.

Finished gear is inspected on a "Roll-Lock" mandrel. Gears can be machined and inspected on different mandrels without altering concentricity.

"Roll-Lock" arbor drives hob for cutting gears which are accurate within ten seconds of angular error. Ease of actuation simplifies shifting of hob.

Scully-Jones Pin-Cam and "Roll-Lock" arbors and mandrels increase precision by providing an even distribution of force around the bore (or against the faces of adjacent splines). They eliminate all play and accurately locate the gear or blank. Runout and wobble are reduced—especially important when turning and facing gear blanks which are stacked for hobbing.

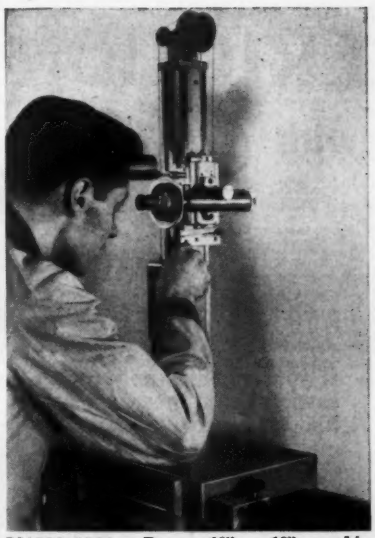
"Roll-Lock" tools are a simple and fast method of creating a powerful centering fit. They eliminate tapered mandrels and arbor presses—permit transmission of torque and thrust required for heavy cuts. Runout is often less than .0001 in.

Gear blanks can be locked firmly on Pin-Cam mandrels, which apply equal force around the splined bore, eliminating play and accurately locating the part. Thrust from machining helps maintain pressure of the pins against adjacent splines. Pitch line of the cut gear can be held concentric to the splined bore. And there's no possibility of backing plates or collars springing the arbor and causing lead errors.

Scully-Jones and Company
1913 South Rockwell Street, Chicago 8, Ill.

SCULLY JONES **PRECISION HOLDING TOOLS**

CIRCLE INFORM-A-GRAM KEY NO. 1031



M1238-1818 — *Range 18" x 18", working distance 9" to infinity. Reads to 0.001" up to 24" working distance. Protractor ocular reads to 3 minutes of arc. Image is erect.*

Cut inspection time in half

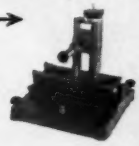
with new Gaertner Coordinate Cathetometers

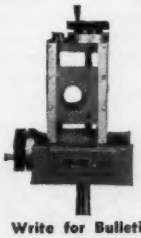
These convenient, reliable optical instruments permit making precise coordinate measurements in a vertical plane. The two dimensions are measured with one setting, object does not have to be rotated. Inspection time is cut in half and resetting errors eliminated.

Versatile Gaertner Coordinate Cathetometers are ideally suited for precision measurements on large objects; also objects or points in recessed, remote, or inaccessible locations. Applications include measuring jet engine sections, complicated castings, printed circuits, bolt holes and bosses on large piece parts, traces on cathode ray tubes, etc.

Because these are optical rather than mechanical measuring instruments, you make non-destructive measurements without contact, distortion, or concern about pressure being applied to the object when making a setting. Instruments available in English or Metric system.

M1236-46— Horizontal range 6", vertical range 4". Reads to 0.0001", working distance 5" to infinity.





M1236-22— Range 2" x 2", reads to 0.0001". Working distance 5" to infinity. Shown with 19 mm mounting rod, and without telemicroscope. Instrument permits precise coordinate movement of other objects such as photo cells, probes, etc., in place of telemicroscope.

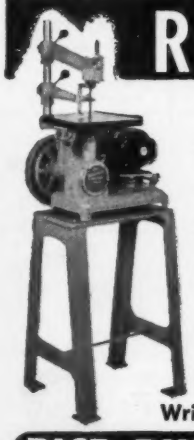
Write for Bulletin 188-53 & 194-57

The Gaertner Scientific Corporation
1242 Wrightwood Ave., Chicago 14, Ill.
Telephone: BUckingham 1-5335

CIRCLE INFORM-A-GRAM KEY NO. 1033

Smoother Production! Higher Output! Lower Costs!

RICE-MILWAUKEE



DIE FILERS . . . for straight-line sharp corner filing, sawing and lapping.

This low cost precision-built unit performs all die making operations at savings up to 40%. Furnished complete with motor and two overarms. No extras to buy.

PROFILE GRINDERS

. . . for high speed Precision Grinding of Curved and Irregular Contours.

Standard features include 20,000 or 30,000 R.P.M., or a combination of these spindle speeds, ½ H.P. motor, Collet Chuck, Compound tilting table, built-in wheel dresser.

Write for Illustrated Bulletins and Prices

RICE PUMP & MACHINE COMPANY
228 PARK AVENUE BELGIUM WISCONSIN

CIRCLE INFORM-A-GRAM KEY NO. 1032

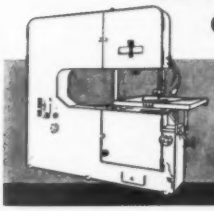
FRICTION SAWING with Tannewitz HIGH SPEED BAND SAWS

FASTEST, BEST MEANS OF CUTTING METALS

If you are not familiar with the advantages of friction sawing with these machines, by all means drop us a line asking for "Friction Sawing Data." You can save many times the cost of a Tannewitz High Speed Band Saw and greatly expedite production by using it to cut sheets of both hard and soft steel, formed or flat, trimming malleable and steel castings, cutting armor plate or many other materials. Write NOW!

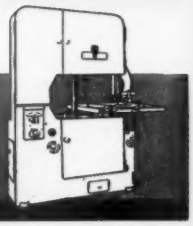
THE TANNEWITZ WORKS

GRAND RAPIDS, MICHIGAN ☎ **GL-6-1729**



TANNEWITZ DI-SAWS — 24", 36", 48", 60" CAPACITIES for CONTOUR SAWING, FILING, POLISHING

The smoothest, fastest, most trouble-free DI-Saws on the market. Write for bulletin.

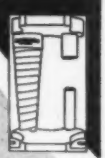


CIRCLE INFORM-A-GRAM KEY NO. 1041

new **ELASTICONE®** guide pin covers CUT DIE COSTS 25%

reduce lubrication
reduce maintenance
increase press time
preserve alignment

Discover how inexpensive ELASTICONES can provide increased production, lower die costs by closing the gaps between pins and bushings, reducing die breakage and maintenance. Just snaps into place — no installation or maintenance costs! Bulletin 53 contains complete information. Send for it today!



CENTRAL Safety Equipment Co.

6603 MARSDEN ST. PHILADELPHIA 35, PA.

Use coupon for new Bulletin '57 and Data Sheet '58.

Name_____ Title_____

Firm Name_____

Address_____

City_____ Zone____ State_____

TP-9-58

CIRCLE INFORM-A-GRAM KEY NO. 1042

BEST IN QUALITY...BEST IN DESIGN!

Marcellus PRECISION BUILT TOOLING

ADAPTER BUSHINGS
Finest bushings available anywhere! Spring-type for fast set-ups. Prompt delivery from stock. *Quality guaranteed!*

RELEASING-TYPE TAP HOLDERS

BAR MACHINE TAP HOLDERS

SELF-ALIGNING REAMER HOLDERS

TURRET CHANGE ROLLS AND STUDS

ORIGINAL NON-RELEASING TAP HOLDER WITH HOLE THRU SHANK

REVOLVING STOPS

RECESSING TOOLS

CAM AND BOX MILL ROLLS AND PINS

GAGES

ADAPTERS

NEW CATALOG... FREE

Get your copy NOW. Complete sizes and specifications for easier tool planning. WRITE TODAY. *Open territories available.*

Marcellus Mfg. Co. BELVIDERE ILLINOIS

CIRCLE INFORM-A-GRAM KEY NO. 1043

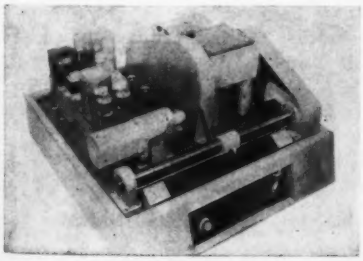
Grind or Sharpen an accurate cut-off tool quickly and easily with this tool grinding fixture that accommodates bits ½" or smaller. The bit is

locked by a set screw in a square hole in the fixture, and the fixture is placed on the magnetic chuck of a surface grinder. R. L. Spellman Mfg. Co., Urbana, Ohio, or — **No. A41.**

A Fully Automatic Gear Hobbing Machine for hobbing spur, helical, and worm gears; worms; or similar generated profile, the Koepfer 170 can be supplied with a magazine feed attachment, providing automatic loading, chucking, and machining on up to 5⅛" blanks, or operated semi-automatically for short runs. Cosa Corp., 405 Lexington Ave., New York 17, or — **Circle No. A42.**

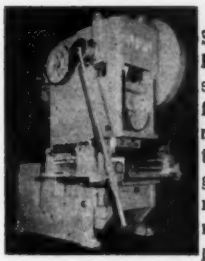
Go-No Go Plug Gages and kits from stock are offered by PIC Design Corp., 477 Atlantic Ave., E. Rockaway, L. I., N. Y. They are available in sizes from ⅛" dia to ¼" dia. Components are listed in Catalog 17, available from the company, or — **Circle Inform-A-Gram No. A43.**

Simplified Control Systems introduced by Seneca Falls Machine Co. can be used on tracer lathes and for other applications, including variable and precise speed controls requiring ¼ to 100 hp. They may be used in



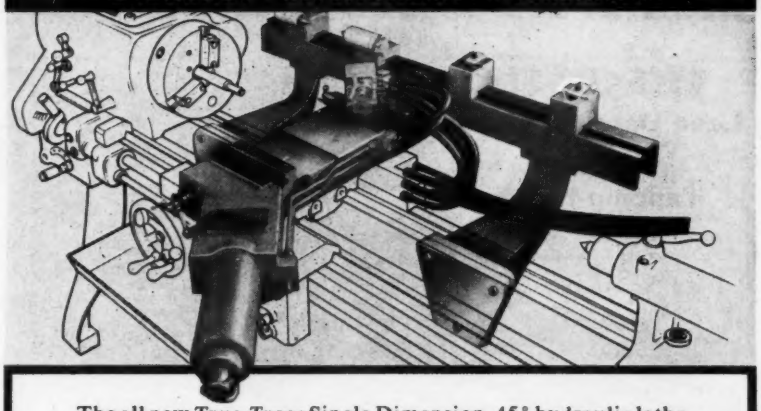
conjunction with computors or with signal sources sensing linear motion or distance, pressure, etc., as well as manual controls. Seneca Falls Machine Co., Electronics Div'n, Seneca Falls, N. Y., or — **Circle No. A44.**

Turning Applications like step shaft tracing, turning, and facing operations can be performed by this lathe tracer attachment. It converts standard lathes to contour machines, yet still allows normal turning; round or flat templates can be used. True-Trace Sales Corp., 9830 E. Rush St., El Monte 50, Calif., or — **Circle No. A45.**



75- to 250-Ton Single-Point Gap Presses are equipped with feeds for automatic production. Either single- or double-roll feed equipment can be supplied on the Series G1 presses, available in fixed base and inclinable types. The Minster Machine Co., Minster, Ohio, or—**Circle Inform-A-Gram No. A46.**

TRUE-TRACE
LATHE TRACER ATTACHMENT
ACCURACY • DEPENDABILITY • VERSATILITY



The all new *True-Trace* Single Dimension, 45° hydraulic lathe tracer attachments are specifically designed and engineered to convert standard engine lathes to modern contour turning machines. *True-Trace* precision controls and unique features permit relatively unskilled labor to produce a greater volume of parts, more accurately... at less cost! Whatever your job or requirements, let *True-Trace* show you how to get more from your present lathes with a tracer attachment.

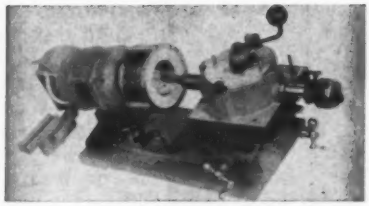
- ADAPTABLE TO MOST LATHES
- NEW CROSS AND TOOL POST SLIDES—CAST OF MEEHANITE
- USES FLAT OR ROUND TEMPLATES
- MICROMETER TRACER ADJUSTMENT
- NITRIDED WAY SURFACE
- PLUS MANY OTHERS

Write for new illustrated brochure #LTA-1 for complete data TODAY!

"Sponsor of Contour Machining Conferences"

TRUE-TRACE SALES CORPORATION
9830 E. Rush St., El Monte 39. California
Branch Plants: 35 Urban Ave., Westbury, Long Island, N. Y.
2401 Eaton Lane, Racine, Wisconsin
DEALERS IN PRINCIPAL CITIES

CIRCLE INFORM-A-GRAM KEY NO. 105



Eliminate Sending End Mills Out to be sharpened by doing your own radial relief work by grinding inside the wheel with the Multi-Spiral fixture with 2-way cross slides. It finish grinds spiral lips and end in one operation, and handles both right and left hand mills. Spiral Step Tool Co., 5400 N. Damen Ave., Chicago 25, or—**Circle Inform-A-Gram No. A47.**

A Rugged Holding Device, the Palmgren "Low-Boy" vise, is used for milling, drilling, shaping, and grinding. Models 325B and 425B can be used with or without swivel bases,

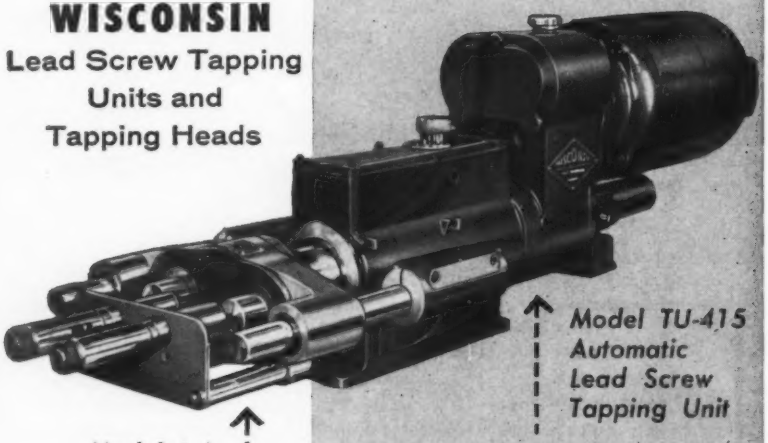
and the vise body as well as the base have bolt slots for mounting to machine tables. Chicago Tool and Engineering Co., 8383 S. Chicago Ave., Chicago 17, or — **Circle No. A48.**

Simplify Ejection of Light-Weight pieces stamped at high speed using a new horizontal mounting on the Press-Rite 30-ton OBI press equipped with air clutch. Fabricated steel base provides solid base for horizontal mounting, and the motor mount has screw adjustment for belt tension. Press-Rite Div'n, Sales Service Machine Tool Co., 2563 University Ave., St. Paul 14, Minn., or — **A49.**

Precision Built for...

HIGH SPEED PRODUCTION TAPPING

WISCONSIN
Lead Screw Tapping Units and Tapping Heads



Model TU-4 1/5 Automatic Lead Screw Tapping Unit

Model L.A. 2-Spindle Tapping Head

This unit is regularly furnished with a flanged quill and slotted spindle for close coupled, multiple spindle, precision tapping heads. For single spindle tapping, it can be furnished without the quill flange, and with an A.S.A. 1" dia. adjustable adapter for a No. 1, 2 or 3 Morse taper.

WISCONSIN builds Adjustable and Fixed Spindle Drill Heads and Tapping Heads, Lead Screw Tapping Units, Special Machines, Fixtures, Fixture Bases and Index Tables.

Write for Illustrated Literature

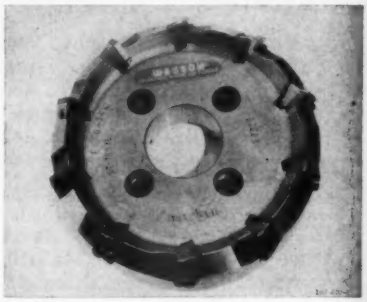
WISCONSIN DRILL HEAD CO.

4975 N. 124TH STREET • BUTLER, WISCONSIN

A7-9187

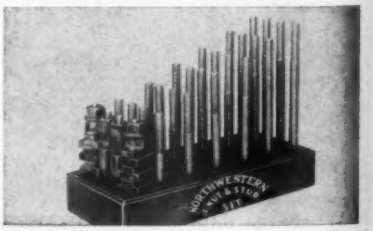
CIRCLE INFORM-A-GRAM KEY NO. 106

Use Throw-Away Insert Milling Cutters, with hardened-steel locking wedges behind the carbide inserts that protect the cutter body. Depending on the inserts used, they can



mill steel or cast iron and take roughing or semi-finishing cuts. Wesson Co., 1220 Woodward Hts. Blvd., Detroit 20, or — **No. A50.**

T-Nut and Stud Sets have been added to the line of hold down tools by Northwestern Tools, Inc., 116 Hollier Ave., Dayton 3, Ohio. Available for T-slots in 3/8" through 1 1/16" widths, the sets include four each of



3" through 8" studs, four flanged nuts, four coupling nuts, and six T-nuts to fit your machine and a holder. Write the company, or — **Circle Inform-A-Gram No. A51.**

TAKES YOUR EYE TO "INACCESSIBLE" INTERIORS

The National Fontar® Borescope provides sharp, critical close-up vision aided by bright lighting in any bore, threaded hole, recess or interior surface of the cast, drawn, welded or molded product. All that is needed is a point of entry .10" or larger . . . . It's today's essential for high Quality Control standards. Our new and free catalog illustrates and describes applications.

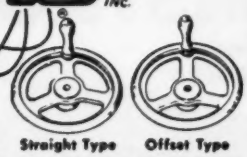
ASK FOR BORESCOPE CATALOG "B"

ENGELHARD INDUSTRIES, INC.
NATIONAL ELECTRIC INSTRUMENT DIVISION
92—21 Corona Avenue • Elmhurst 73, New York

CIRCLE INFORM-A-GRAM KEY NO. 1071

Tomco INC.

HAND WHEELS



SPECIALS

- HAND KNOBS
- MACHINE HANDLES
- HANDLES
- BALL HANDLES
- LEVERS
- SPECIALTIES

GRADUATED DIALS

SPECIFY TOMCO FOR DEPENDABILITY

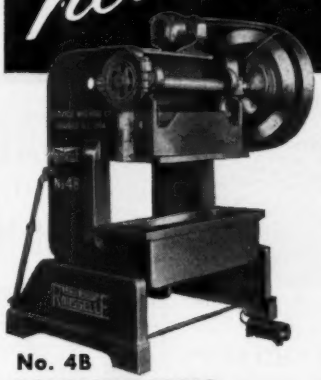
A Complete line of high grade hand knobs, levers, handles, hand wheels, graduated dials is available for immediate shipment from stock of standard items. Specialty items made to your specifications.

WRITE FOR INFORMATION

Tomco INC.
1625 DOUGLAS AVE., RACINE 2, WIS.

CIRCLE INFORM-A-GRAM KEY NO. 1072

New 40-TON DOUBLE CRANK O. B. I.
ROUSSELLE



WITH NEW ELECTRICALLY CONTROLLED AIR CLUTCH

- "Plug-in" foot and hand controls.
- Single stroke, continuous and jog selector.
- Low air consumption.
- Large die area.
- Roller bearing flywheel.
- Bronze main and crank bearings.

No. 4B
ROUSSELLE PRESS

CHOICE OF 30 SIZES AND TYPES IN 5 TO 40-TON PRESSES

SERVICE MACHINE CO.
Mfrs. of Rousselle Presses
2310 WEST 78th STREET • CHICAGO 20, ILL.

ROUSSELLE PRESSES ARE SOLD EXCLUSIVELY THROUGH LEADING MACHINERY DEALERS

CIRCLE INFORM-A-GRAM KEY NO. 1073

90FS FLUTE GRINDER

Automatic Universal

Grinds straight or spiral flutes from solid, including carbides, in tools such as:

- Drills as small as 1/16 inch dia.
- Spiral or straight taper reamers.
- Spiral or straight milling cutters and end mills.
- Sharpens saws up to 12 inch in diameter and in gangs up to 7¾" long.

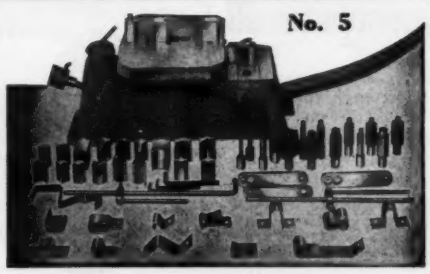
WARDWELL
3809 Ridge Road
Cleveland 9, Ohio

AUTOMATIC INDEX FEED

Write for free Bulletin 90-FS

CIRCLE INFORM-A-GRAM KEY NO. 1074

No. 5



WRITE FOR DESCRIPTIVE CIRCULAR

J. A. RICHARDS COMPANY

Multiform

BENDER-CUTTER

CUTS, BENDS, PUNCHES

Available in hand, air or hydraulic models. The MULTIFORM is shipped complete with full assortment of dies and mandrels to form and cut round or flat stock up to ⅛" x 1½" as illustrated. Punching dies available. Other models up to ½" x 8" hydraulic operated. Ideal for steel rule die forming.

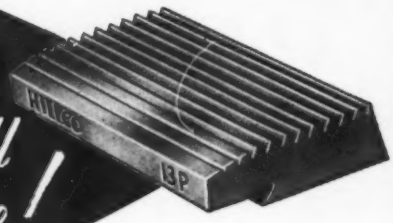
ALSO AIR OPERATED MODELS

KALAMAZOO, MICH.

CIRCLE INFORM-A-GRAM KEY NO. 1075

"HILLCO" TANGENT CHASERS

We think you'll agree!



The new line of "HILLCO" Tangent Chasers, which can be re-ground for 80% of their original length, are guaranteed to be of highest grade tool steels ground to exacting tolerances. We feel that this complete line of chasers are the finest that we have produced in our 75 years of cutting tool manufacture. We think that you will agree with us.

THE HILL ACME COMPANY
ACME MACHINERY DIVISION
1203 West 65th Street • Cleveland 2, Ohio

CIRCLE INFORM-A-GRAM KEY NO. 1081

GAGE COMPANY *Deep-Etch*

PRECISION PLASTIC • NON-BREAKABLE

COMPARATOR SCALES

Highly accurate and designed for making quick measurements at scale on projectors and comparators without any movement of machine or work.

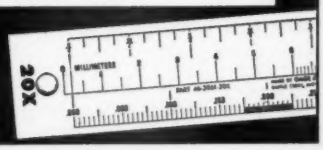
Supplied on Gage Company Precision Plastic . . . a sturdy, non-breakable material of constant stability, .125 in thickness.

Unexcelled as a tool for use in drafting and engineering scale layouts for use on comparators.

Available in all standard magnifications and in several lengths. Various styles for all applications.

WRITE FOR BULLETIN NO. 58-70

GAGE COMPANY
• • • BOX 1080
Battle Creek, Michigan



CIRCLE INFORM-A-GRAM KEY NO. 1083

BURR-BIT CUTS TAPPING COST WAY DOWN!

Just lock Burr-Bit on any make tap and holes are deburred automatically, leaving a smooth clean chamfer. ONE OPERATION, ONE SETUP, ONE HANDLING.

NEW ADDITION
Now Burr-Bit fits 3 fluted taps from #6 to ½". Also available to fit any tap 2 or 4 fluted from #2 to ¾".

A quality product made of the finest high speed tool steel for use on almost every material.

WRITE now for complete data and reports from engineers who have adapted Burr-Bit and saved on their tapping operations.
INVESTIGATE Burr-Bit-today.

VERNON DEVICES, Inc.
481 E. 3rd Street Mt. Vernon, N.Y. MOunt Vernon 4-1686

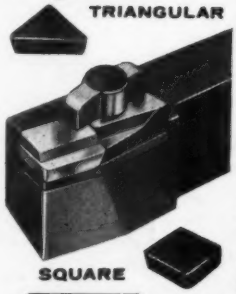
CIRCLE INFORM-A-GRAM KEY NO. 1082

New Positive Rake ARMSTRONG

Carbide Insert TOOL HOLDERS

with proven ARMSTRONG Design Features

TRIANGULAR



SQUARE

Rapid Indexing—easily accessible from top or bottom.
Replaceable Seat of Hardened Tool Steel.
Huskier shanks of Heat Treated Alloy Steel.
Shank Styles for both Conventional and Open Side Tool Posts.

For every day tool room and production turning on engine lathes, turret lathes and screw machines. Permit increased cutting speeds of carbides while eliminating carbide tool grinding.

Low cost positive rake ARMIDE "throw away" inserts provide three or four cutting edges per insert. Available in three grades of ARMIDE: 350, 370 or 883.

Buy positive and negative rake Carbide Insert Tool Holders by ARMSTRONG—leader in tool holders and cutting tools for over sixty years.

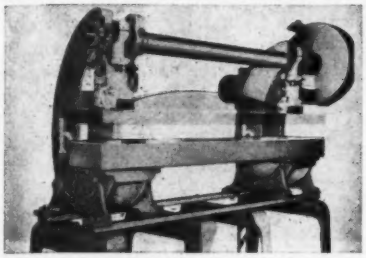
Buy ARMSTRONG TOOLS from your Industrial Distributor

Write for Circular

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
5270 W. ARMSTRONG AVE. • CHICAGO 30, ILL.

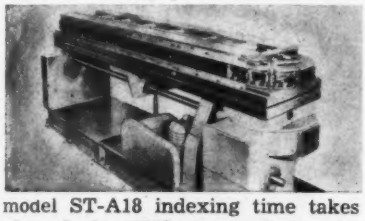
CIRCLE INFORM-A-GRAM KEY NO. 1084

Stamping, Forming, or Trimming Operations on relatively large material of light gage or soft composition can be performed on this 8-ton press. The 45" center to center distance between rams will accommodate coil



or sheet stock up to 37" wide. Different stock width openings and ram center distances are available. Benchmaster Mfg. Co., 1835 W. Rosecrons Ave., Gardena, Calif., or —
Circle Inform-A-Gram No. A52.

A Conveyor-Type Cam-Operated Indexing Chassis is designed for automatic assembly or production. Work carriers, integral with chain links, accurately position work. On



model ST-A18 indexing time takes place during 120° of cam shaft rotation; the rest is dwell or worktime. Standard Tool & Mfg. Co., 237 Laurel Ave., Kearny, N. J., or — **No. A53.**

Forged Swing Clamp Assemblies are available in two styles for extreme clamping pressure in close quarters, and come in a choice of fastening with stocket head screw or

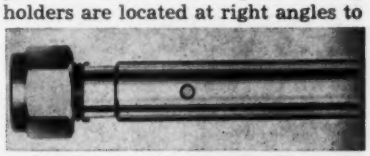
nut. They are forged with bodies ground to the top collar for backing so clamps will not bend back under tension. Jergens Tool Specialty Co., 712 E. 163 St., Cleveland 10, or —
Circle Inform-A-Gram No. A54.

X-Press Taps now come in 5/16" and 3/8" sizes in both NC and NF styles. These taps cold form internal threads in ductile metals without cutting and without chips. For more information, write Besly-Welles Corp., S. Beloit, Ill., or — **Circle No. A55.**

This Expanding Collet provides an expanding member to locate and hold work from the inside, using present 5C equipment on lathes, milling machines, grinders, and fixtures,

without attachments. The soft mandrels may be machined to fit any ID from 3/8" to 1 5/8". Dunhan Tool & Mfg. Co., R.F.D. 4, Danbury, Conn., or—**Circle Inform-A-Gram No. A56.**

Parallel- and Angular-Type Floating Holders for reaming, and tapping, have a small outside diameter. The pins in these double-pin floating holders are located at right angles to

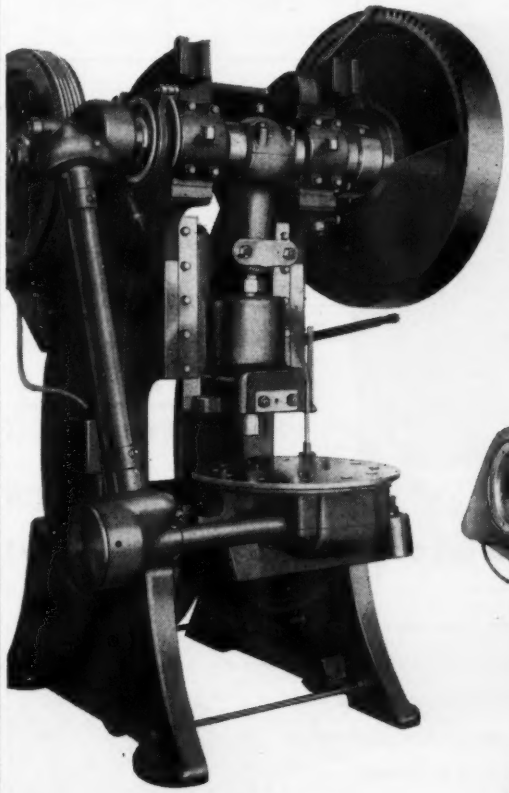


each other, permit pivoting about the point of contact to adjust for angular misalignment. Erickson Tool Co., 34350 Solon Rd., Solon, Ohio, or —
Circle Inform-A-Gram No. A57.

Modern FEDERAL Dial Feeds give you

automation at less cost!

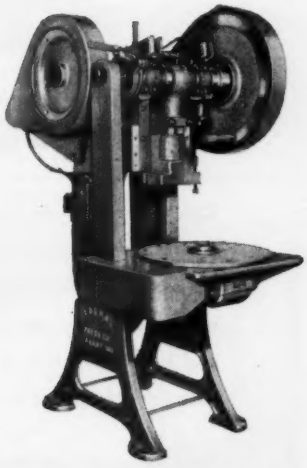
—eliminate specialized and more costly equipment!



No. 7 Dial Feed
Gear Driven. Capacity, 80 tons.

Federal Dial Feeds are your answer to greater production at lower costs. Equipped with special jigging, automatic feeds and ejectors, their applications are virtually unlimited and the need for specialized, more costly equipment often eliminated. (Example, one manufacturer increased production 600%.)

Add Federal's quality features and workmanship... and you've got a winner. Investigate Federal Dial Feeds for your operations. Gear or chain driven with cam-type indexing mechanisms. Sizes range from 6 to 80 tons.



No. 3 Dial Feed
Chain Driven. Capacity, 25 tons.

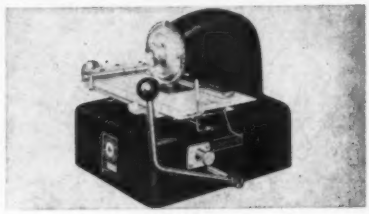
FEDERAL PRESS COMPANY
807 Division St., Elkhart, Indiana

FEDERAL DIAL FEED PRESSES
33 Years' Experience in Dial Feed Engineering and Construction

Produce Accurate Optical Comparator Layouts on the new Model 14-A scribing machine. Accurate to 0.001", it features a free-floating table

and scribe carrier to speed layout work, and has up to 14" dia and 11" x 14" rectangular capacity. Optical Gaging Products, Inc., 26 Forbes St., Rochester 11, N. Y., or — **No. A58.**

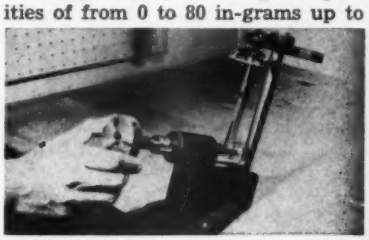
A Hand-Operated Detail Press for low production name plate and small part stamping features automatic spacing and alignment of work. Easy-turning character wheel locates each character quickly and easily, and operating lever delivers up to



two tons pressure. Defiance Machine and Tool Co., 1920 S. Vandeventer Ave., St. Louis 10, or —

Circle Inform-A-Gram No. A59.

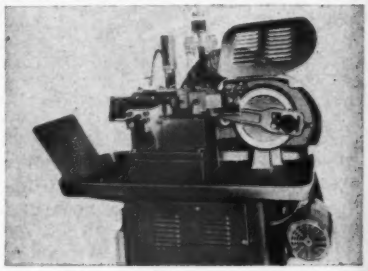
A New Torque Checking Fixture, designed as a laboratory inspection device or production line inspection checking fixture, has torque capacities of from 0 to 80 in-grams up to



and including 0 to 100 in-lbs. Model TCF100 permits selection of different torque wrenches for checking thread ring gages and screw drivers. P. A. Sturtevant Co., Addison, Ill.

Circle Inform-A-Gram No. A60.

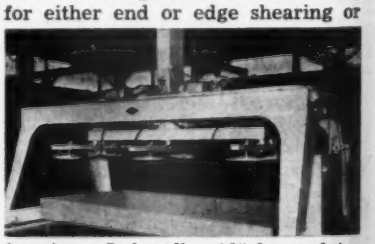
These Thread Rolling Machines, designed for heavy-duty production, can produce 60 to 120 pcs/min and have maximum thread diameter of



5/16". Two models are manually fed and two hopper fed. Literature is available from Mettler Machine Tool, Inc., 150 Adeline St., New Haven, Conn., or —

Circle Inform-A-Gram No. A61.

Feed High Speed Shearing or press brake operations with a new model automatic plate handler. It offers 5,000-lb capacity and rotatable lift beam which permits direct feeding for either end or edge shearing or



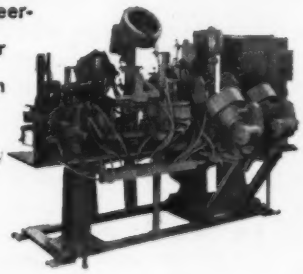
forming. It handles 16" long plates in transverse position for edge feeding, or longer in longitudinal position for end shearing. Noble Co., 1760 7th St., Oakland, Calif., or —

Circle Inform-A-Gram No. A62.

Part: Carburetor economizer diaphragm valve.
Operation: Gaskets and diaphragm cut from reel stock. Seven parts assembled.
Production: 900 valves per hour.

83% labor savings with automated assembly!

Can you automate your assembly operation economically? Gray's engineering staff is best equipped to answer your question. Design, manufacture, installation and initial operation of automated assembly equipment is our only business.



Write for our 24 page bulletin, "Automated Assembly."

gem **GRAY equipment company**
13600 Ford Road • Dearborn, Mich. • Telephone: Tiffany 6-7573

CONTRACT SERVICES DIRECTORY

Listings, $12.00 per inch ($1.50 per ¼ inch) Minimum charge, $4.50 per insertion. Rates net

Illinois

DRESEL-BETZ CO.
Belleville, Ill.
Designers and Manufacturers of Tools, Dies, Jigs, Fixtures, Metal Stampings.

Michigan

DAVIS TOOL and ENGINEERING CO.
19250 Plymouth Road, Detroit, Michigan, VErmont 5-6000. Tools and Dies, Special Machinery, Sheet Metal Stampings and Assemblies.

Ohio

CLEVELAND UNIVERSAL JIG COMPANY
13484 St. Clair Ave., Cleveland, Ohio.
MU 1-2800
DESIGNERS AND BUILDERS
Jigs and Fixtures Special Machines
Production Engineering
Complete Plant Routing and Tooling

GENERAL DIE & TOOL CO.
2067 W. 55th St., Cleveland, Ohio
WO 1-4736
Dies, Tools, Jigs, Fixtures, Light Stampings, Special Machinery Manufacturing.

THE INDUSTRIAL MACHINE CO.
1436 East 47th St., Cleveland, Ohio. Founded in 1906. Builders of Special Machinery. General Machine Work.

KIFFER TOOL & DIE CO.
5601 Tillman Avenue, Cleveland, Ohio, WOodbine 1-2440 & 1-2441. Manufacturers of Special Machinery, Tools, Dies, Jigs, Fixtures, Swiss Jig Boring.

NOBLE & STANTON, INC.
908 Broadway, Bedford, Ohio, Bedford 2-2300. Tooling, Short Run Production and Machined Parts for Automation.

HARDNESS TESTING
has been done with the SCLEROSCOPE
Since 1907
•
THE SHORE INSTRUMENT & MFG. CO., Inc.
90-35 Van Wyck Expressway
Jamaica 35, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 1111

YOU CAN NOW *Lease*

THE HIT OF THE SHOW

SPECIAL MACHINE TOOLS AND STANDARD COMPONENTS
47 - VARIETIES STANDARD BUILDING BLOCKS

THIS OFFER WILL PROVE:

The most rugged and accurate design.
The latest and finest in quality and performance.
The most flexible with largest power maximums.
The best solutions to 95% of machining problems.
Exclusive in its Field of Drilling, Tapping, Boring, etc.

BOREMATION — WAY-TYPE
Exclusive in the Field of Gun Drilling.
Due to Consistent-Infinite-Locked-Circuit Hydraulic Feeds.

DRILLMATION–TAPMATION–BOREMATION

DRILLMATION
DRILLMATION CO.
6500 E. ELEVEN MILE ROAD
CENTER LINE, MICHIGAN
JEfferson 9-2030

CIRCLE INFORM-A-GRAM KEY NO. 1112

HARDENED and GROUND HSS BLANKS
Any decimal diameter — any length. Mirror finish surface to gage tolerance.
Many uses —
—core pins, punches, gages, ejector pins, insert pins, special tools, etc. — Quick delivery.
Write or phone DRexell 6-4223 for price list D-3
WILLIAM T. HUTCHINSON CO.
53 Brown Ave., Springfield N. J.

CIRCLE INFORM-A-GRAM KEY NO. 1113

PRECISION CHAMPION ®

short sleeve expanding mandrel

Champion precision expanding mandrels are now available with short sleeves which save 25% to 35% of your cost. Precision of .0002" T.I.R. in all sizes is guaranteed with 100% inspection before shipment. Standard sizes are available from 5/32" to 9½" O.D. All mandrels have several sleeve sizes to fit each arbor for greater economy. We have the mandrel that fits your requirements exactly—and we can supply most sizes from stock today.

Send for free catalog giving complete line, specifications and prices

THE WESTERN TOOL & MANUFACTURING CO., INC.
SPRINGFIELD, OHIO FAIRFAX 3-9151
CIRCLE INFORM-A-GRAM KEY NO. 1121

GEORGE L. DETTERBECK CO.
SINCE 1911

World's Largest Exclusive Manufacturer of
SCREW MACHINE TOOLS!

CUTTING CAMS
HIGH SPEED STEEL AND CARBIDE FORM TOOLS
SPECIAL CUTTING TOOLS
SPLIT DRILL BUSHINGS
CROSS SLIDE KNURL HOLDERS
TOOL BITS
BOX TOOLS
BURNISHING TOOLS
REVOLVING STOPS
RECESS SWING TOOLS
FORMING SWING TOOLS
Standard sizes 00, 0, 2, carried in stock.

We specialize in one thing only . . . designing and making SCREW MACHINE TOOLS!

47 years experience goes into every tool we make. They come to you ready for use . . . Precision design . . . Skilled workmanship . . . Finest materials.

Our extensive facilities save you TIME . . . MONEY . . . and give you accuracy, quality and quick service.

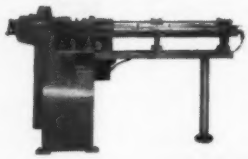
• 47 Years at the Same Address

GEORGE L. DETTERBECK CO.
1871 Clybourn Avenue • Chicago, Illinois

CIRCLE INFORM-A-GRAM KEY NO. 1122

Now High Speed Straightening and Cutting of Fine Wire .020 to .080

New SHUSTER MODEL A produces up to 12,000 pieces per hr.*



1. Capacity .020" to .080"
2. Geared to feed 125 F.P.M.
3. Electric trip mechanism on target
4. Solenoid-actuated roll-type clutch
5. High speed five die straightening arbor mounted on ball bearings
6. Rigid cast iron base

The *New* Model A from SHUSTER, the *oldest* name in the trade, raises production sights for the most-used wire between .020" and .080" diameters. This *constant speed, electrically controlled* machine, with advanced engineering features, incorporates the same skill and care in manufacture that keep SHUSTERS performing at peak efficiency far beyond normal life expectancy.

Users report their *new* '58 Model A High-Speed machines have already paid for themselves. Send us your wire straightening and cutting requirements from .020" to 11/16".

**12,000 pieces per hour based on straightening and cut-off of 6" lengths of .040" diameter basic bright wire. Applies to larger sizes also.*

METTLER MACHINE TOOL, INC.
150 West Adeline St., New Haven, Conn.
CIRCLE INFORM-A-GRAM KEY NO. 1123

For gaging close-tolerance holes

Here's the answer!

Here's the required **PRECISION** for hole tolerances within .0001".

For holes 1/8" to 10" diameter

TREMENDOUS ECONOMY

—a very modest cost puts it to work . . . no training program, no wires, air hose or electronics.

Unique construction gives positive 2-point gaging. Detects tapers, ovality, bell mouth. Shows ACTUAL SIZE. Fixed, not passing, reading. Special plugs gage shoulders, splines, recesses, spherical holes, etc.

COMTORPLUG USERS INCLUDE

Airesearch Mfg. Co.
Allison Div.
Apex Electrical Mfg.
Buick Motor Div.
Century Electric Co.
Chicago Pneu. Tool
Chrysler Corp.
Continental Motors
Curtiss-Wright
Detroit Transmission
Douglas Aircraft
Fairchild Engine & Airplane Co.
Falk Corp.
Ford Motor Co.
General Electric Co.
Hamilton Standard Division
Harris Seybold Co.
Homelite Corp.
Int. Harvester Co.
Jacobs Mfg. Co.
Lycoming-Spencer Div.
McDonnell Aircraft
National Lead
Northrop Aircraft
Pontiac Motor Div.
Scintilla Magneto
Steel Products Eng.
Studebaker-Packard
Sylvania (Atomic Div.)
United Airlines
Warner Gear Div.

Get the facts . . . then decide.

SEND FOR BULLETIN 50 →
Comtor Co., 82 Farwell St., Waltham 54, Mass.

COMTORPLUG

CIRCLE INFORM-A-GRAM KEY NO. 1124

The Carpenter Steel Co. has appointed **James O. Peale** as manager of distributor sales, with headquarters at the company's home office in Reading, Pa.

New manager of sales for the Ingersoll Products Division of Borg-Warner Corp. is **Blaz A. Lucas, Jr.** He succeeds **Robert A. Anderson** who is retiring as vice president of sales.

Chicago Latrobe Twist Drill Works announces the transfers of **Ed Allen** from the Buffalo area to San Francisco, to be sales and service representative in northern California and Nevada, and **Ted Robertson,** from Chicago to Buffalo to represent western New York and northwestern Pennsylvania.

Harry Vance now serves as West Coast factory salesman for Portage Double Quick, Inc., with headquarters in Compton, Calif.

Taking over as mountain states district sales director for Benchmaster Mfg. Co. is **L. Drew Bax. James J. Stafford** was recently appointed district sales director for the Pacific northwest area.

The Hydraulic Press Mfg. Co., a Division of Koehring Co., announces the following promotions: **E. L. Oehling,** to vice president of sales; **T. G. Bishop,** product market manager; and **W. G. Kriner,** head of the Plastics Division.

New Detroit district sales manager for the E. W. Bliss Co. Press Division is **J. L. Chase.** He succeeds **F. P. O'Keeffe** who has retired.

Appointment of **C. R. Toolin** as district sales engineer for the Cleveland-Pittsburgh area has been announced by The Fenn Mfg. Co.

Raymond E. Breitung is the new sales manager of foundry products for the Kaukauna Machine & Foundry Division of the Giddings & Lewis Machine Tool Co.

New personnel changes at The Timken Roller Bearing Co., Steel and Tube Division, include: **O. C. Miller,** Buffalo district manager; **R. R. Hershey,** Cincinnati district mgr.; and **John Winters,** Chicago sales engineer.

Howard M. Givens has moved up from regional sales manager to become vice president of sales for Latrobe Steel Co.

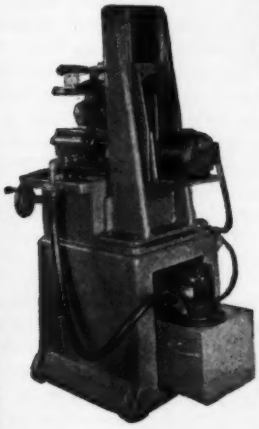
Two new field engineers have been announced by Norton Co.: **Carl H. Foltz, Jr.,** serves in Chicago and **Thomas M. Hankin** in Atlanta.

DALZEN

THREAD GRINDER

- **AVERAGE SET-UP TIME 30 MINUTES!**
- **SAVES FLOOR SPACE!**
- **LOW COST!**

Excellent for tool room and production Thread Grinding. Easily set-up from job to job! Has built-in relieving attachment as standard equipment for grinding of taps. This remarkable machine may also be used to grind angles, grooves and surfaces where concentricity is an important factor!



Dresser and wheel head are self-compensating. Size of work is automatically maintained after dressing of wheel regardless of how much is dressed off.

The grinding and regrinding of thread rolls up to 3" in diameter and thread milling cutters can also be ground with special attachment.

Photo shows just a few of the many jobs done on the DALZEN THREAD GRINDER.

2 in 1 COMBINATION CENTER GRINDER & DRILL PRESS

A drill press and center lapping machine at less than the cost of many single purpose center grinders! In addition to savings on equipment costs, the Dalzen "2 in 1" permits maximum man-hour production thereby keeping your unit cost at a minimum!

1 SIMPLE OPERATION CHANGES CENTER GRINDER TO DRILL PRESS

Center grinder to drill press or drill press to center grinder in a matter of seconds! Simply unlock clamping handle and swing diamond dresser in or out of position! Photo at right shows center grinder at work.

A full 43" capacity from base to spindle . . . dresser adjustment from 20° to 100° included angle . . . drills to center of 15" circle . . . maximum lapping stone dia. 3".

WE ALSO SPECIALIZE IN
THREAD ROLLING DIES AND THREAD HOBS
LITERATURE ON REQUEST

DALZEN MANUFACTURING CO.
4600 BREE ROAD **DEPT. TP-8**
ST. CLAIR, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 113

SHOP AIDS

Learn Where and How Molykote Lubricant should be applied by getting a small bulletin from The Alpha-Molykote Corp., 65 Harvard Ave., Stamford, Conn. A chart outlines applications, methods of applying the lubricant, and benefits. Write to the company for a copy of Bulletin 116, or—**Circle Inform-A-Gram No. C1.**

Technical and Application Data on zirconium and hafnium is presented in a catalog. Charts list mechanical properties of zirconium, zirconium alloys, and hafnium, and physical and corrosion properties of these and several other metals. Applications and tips on machining, surface finishing, or welding zirconium are also included. Write to Mallory-Sharon Metals Corp., Niles, Ohio, for your copy, or — **Circle No. C2.**

Seventeen Types of Stainless Steels are covered in a series of data sheets from the Stainless Steel Div'n, Jones & Laughlin Steel Corp., Box 4606, Detroit 34. The sheets cover chemical composition, typical applications, processing, physical properties, mechanical properties, machining, forming, and welding. The relative corrosion resistance of representative types of stainless steels to more than 200 chemicals is also included. Write the company for your copy, or — **Circle Inform-A-Gram No. C3.**

A Maintenance Manual for Tri-Mill end mills includes diagrams on how to measure the end mill for size, how to resharpen diameter teeth, and how to put in new end teeth. A conversion chart and a list of universal collet identifications is included. Write to Illinite Div'n of Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, for a copy, or — **Circle No. C5.**

"Reducing Costs by Proper Care of Arc-Welding Circuits" begins with fundamentals such as basic electricity, primary power source, source of welding power, and terminals and connectors. Pointers are given to help keep electric arc-welding circuits operating properly. This booklet can be obtained from Lenco, Inc., 350 W. Adams, St., Jackson, Mo., or— **Circle Inform-A-Gram No. C6.**

Design Pointers for Powered Metal Parts are contained in a catalog which also lists physical characteristics of powered metal in general and gives production materials. Advantages of, and descriptions of, typical powered metal parts are also given. For the story of powder metallurgy, get a copy of "Compacted Metals" from Compacted Metals Corp., 99 Greenwood Ave., Waukegan, Ill., or **Circle Inform-A-Gram No. C7.**

"Magnesium Tooling Plate Shop Manual" contains 55 pages of information about this light-weight low-cost metal. Properties of tooling plate, design information, and shop working characteristics are discussed. The manual has diagrams of the tools used on this metal, and charts list recommended speeds and feeds for drilling, reaming, etc. Diagrams of typical arc-welded joints for magnesium are presented, in addition to an explanation of the joining method. Specifications are given for round and square tubing, equal angles, channels, and I-beams. Get your copy of this manual by writing The Dow Chemical Co., Midland, Mich., or — **Circle No. C4.**

"Basic Pneumatic Control" gives a brief explanation of pneumatic control and lists the advantages. Many valves, cylinders, and positioners are briefly described and illustrated to show typical formations. Line drawings show how simple and complicated types of control circuits operate. A section also outlines some industrial applications to show what can be accomplished with pneumatic controls. Westinghouse Air Brake Co., Industrial Products Div'n, Wilmerding, Pa., supplies copies, or — **Circle Inform-A-Gram No. C8.**

The Use of Hydraulic Power Cylinders is highlighted in a 32-page bulletin, which also gives helpful charts and descriptive information on column strength, piston rod deflections, acceleration, and factors of safety. Also included are cylinder forces, pressure losses in pipes, and factors to consider in selecting cylinders. Bulletin JH-104N is available from Miller Fluid Power Div'n, 2040 N. Hawthorne Ave., Melrose Park, Ill., or — **Circle No. C9.**

"The Facts About Cemented Oxide" is a folder which tells what it is, where it can be used, who is using it now, and how you can profit by its use. It can be used for finish turning, boring, or facing steel, or cast iron on machines capable of speeds over 500 fpm. Other application data and technical and product information is included. Contact the Metallurgical Products Dept., General Electric Co., Detroit 32, for your folder, or — **Circle No. C10.**

"Tool Steels for The Hot Extrusion Process" gives a description of the extrusion process, and cut-away drawings show a typical extrusion press assembly and tube extrusion process. Aluminum, magnesium, copper, copper alloys, and steel extrusion processes are described together with the various grades of tool steels recommended to obtain better results. Copies are available from Crucible Steel Company of America, The Oliver Bldg., Mellon Square, Pittsburgh 22, or — **Circle Inform-A-Gram No. C11.**

Remember:

A used tool is proved metallurgically sound and makes a sound tool when reworked.

Systematic "NTS" salvage is the best way to cut cutting tool costs

Stop before you discard a worn or damaged cutter. It may be worth many times its scrap value!

Since 1912 we have been restoring all kinds of cutting tools to new usefulness to help shops control their cutter costs.

Can we assist you in studying your operations and tool usage to determine if a salvage program will save money in your plant? There is no obligation.

Write for this catalog and the salvage story.

NATIONAL TOOL SALVAGE CO.

6511 EPWORTH BOULEVARD DETROIT 10 MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 1151

Aget offers more! Over 38 standard Dustkop models to choose from . . . *Plus* engineering service to help you select, provide, and install the proper accessories and fittings to complete your dust collecting system. Write for illustrated folder . . . Today!

AGET MANUFACTURING COMPANY

1394 E. CHURCH STREET • ADRIAN, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 1152

low cost
HYDRAULIC KEYSEATER
cuts standard, tapered keyways ¼" to 2" wide

- fast set-up—saves time and money
- low cost operation-uses standard tool bits
- heavy-duty hydraulic circuit—assures accurate keyways
- compact, 21" x 61"—no special foundation

Send for Bulletin 34

E. W. BLISS COMPANY

1132 N. Seventh St., San Jose, Calif.

CIRCLE INFORM-A-GRAM KEY NO. 1153

NOW GET CLEAN SURFACED PARTS FROM YOUR AUTOMATICS . . . *UNMARRED* BY TOOL WITHDRAWAL MARKS

THE NEW **RELIEVOMATIC SELF-RELIEVING TOOL HOLDER**

SAVES YOU COSTLY SECONDARY FINISHING OPERATIONS

Avoid scratches like this

All clear with "Relievomatic!"

Easily installed on cross-slide or turret

Write today for details.

SILBER PRODUCTS, INC. Nightingale 9-8600

870 Essex Street • Brooklyn 8, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 1154

NEW ALINA DIAL COMPARATOR SET NO. 99

The 3 purpose instrument with unlimited application in your inspection department

Use as Dial Indicator graduated to read in .0001".

Use as Bore Gage covering a range of .200" thru 5.090" and reading in .0001".

Use as Dial Test Indicator graduated in .0005".

The No. 99 incorporates a high quality dial indicator together with all the necessary gage heads and extensions. It may be used directly at your machines or clamped to your fixtures. Furnished in handsome plush-lined case.

Dial Test Indicator Set No. 98, a modification of the No. 99, is especially designed for applications where measurements must be taken in deep holes, slots, etc. Write for detailed brochure.

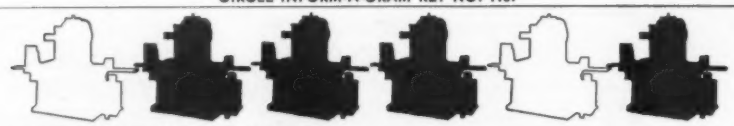
WRITE FOR ILLUSTRATED LITERATURE.

ALINA CORPORATION

122 East Second Street, Mineola, Long Island, New York

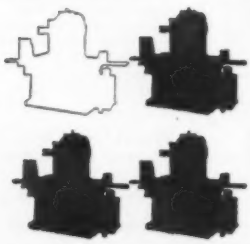
Alina Corporation, 853 East 8 Mile Road, Detroit 20, Michigan

CIRCLE INFORM-A-GRAM KEY NO. 1161



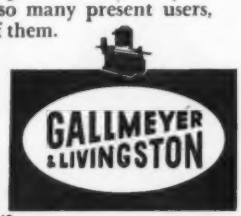
SEVEN OUT OF EVERY TEN

GRAND RAPIDS GRINDERS...



— are purchased by firms already owning one or more of them. Three out of every 10 sold go to new customers. Once you've enjoyed the advantages of a Grand Rapids Grinder in your plant, chances are, like so many present users, you'll surely want more of them.

Write for 24-page book that tells you why.



GALLMEYER & LIVINGSTON CO.

495 Straight Ave., S.W. Grand Rapids, Michigan

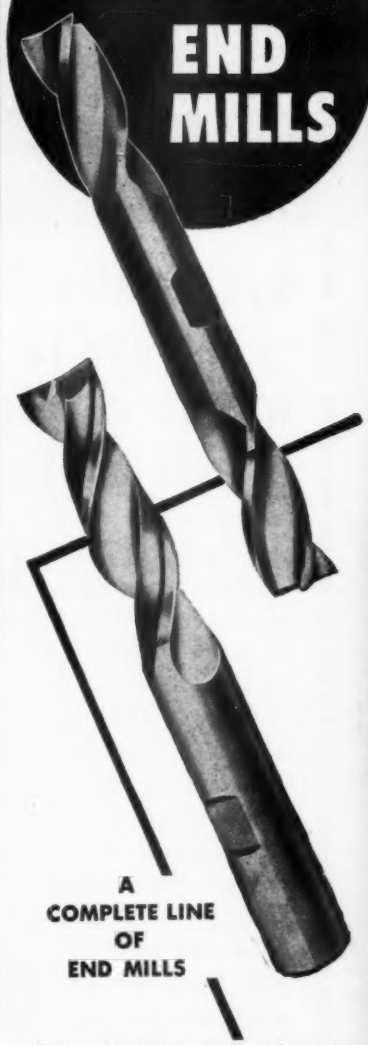
CIRCLE INFORM-A-GRAM KEY NO. 1162

DYKEM
STEEL BLUE
Stops Losses
making Dies and Templates
Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.
Write for sample on company letterhead
THE DYKEM COMPANY
2303L North 11th St. • St. Louis 6, Mo.
With DYKEM Steel Blue
Without DYKEM Steel Blue

CIRCLE INFORM-A-GRAM KEY NO. 1163

ESTABLISHED 1916

ARROW END MILLS



A COMPLETE LINE OF END MILLS

Since 1916 Arrow has been a major supplier of End Mills — one of the oldest because Arrow has always been one of the best.

The Arrow line consists of all type of End Mills plus H. S. Steel and Carbide Tipped Specials.

ARROW TOOL & REAMER CO.

711 Stephenson Highway

P. O. Box 338 • Troy, Michigan

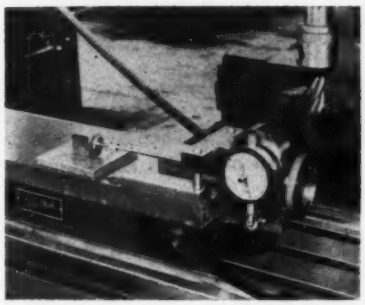
CALL YOUR ARROW DISTRIBUTOR

CIRCLE INFORM-A-GRAM KEY NO. 1164

NEW TESTING METHOD FOR MAGNETIC CHUCKS

An unusual method for testing the gripping power of magnetic chucks has been developed by the O. S. Walker Company. According to Walker engineers, chuck failure occurs when material slides on the chuck bed rather than being pulled from it. For this reason, the testing arrangement shown here is designed to record the load required to slip a steel block of prescribed dimension. A Dillon mechanical force gage with maximum pointer is incorporated to facilitate this reading.

On the chuck bed, a steel block 3" square by ¼" thick is connected by a shaft to the testing mechanism. The mechanism itself consists of two steel plates anchored magnetically to the bed with the gage bracket affixed vertically to these anchors and butted up against the end of the bed. The force gage is seated vertically on this bracket. To the right of the gage is a small hand wheel



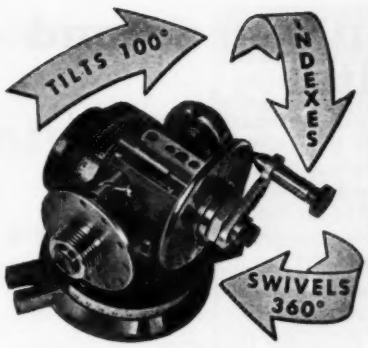
which is connected to the test shaft. It is threaded through the gage bracket but not the gage itself.

As the hand wheel is rotated, pressure is exerted on the test block, gradually increasing until the block begins to slide. This force is accurately indicated by the maximum pointer reading of the force gage.

CONTROL PACKAGE PRODUCES 'CLEAN AIR'

The Alemite Division of Stewart-Warner Corp. has developed Tri-Duty air line controls to provide clean, dry, well-regulated and properly-lubricated air on all air-operated equipment such as air tools, cylinders, motors, clutches, and chucks.

Made up of an air line lubricator, water separator, and air regulator, the control package operates best and with a minimum of pressure drop at flows of 5 to 50 cfm and pressures up to 125 psi.



FOR FASTER PRODUCTION

THE ELLIS

DIVIDING HEAD

Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

NICHOLS MORRIS CORPORATION

76-X MAMARONECK AVE.
WHITE PLAINS, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 1171

CAMS

To Your Specifications

— Except Screw Machine Cams —

Design Assistance Offered

KIDDE PRECISION TOOL CORPORATION
10 Locust Ave., Roseland, N. J.

CIRCLE INFORM-A-GRAM KEY NO. 1172

DEMONSTRABLY, THE WORLD'S FINEST
DIAMOND WHEEL LINE
AVAILABLE IN
RESTRICTED TERRITORIES

We are seeking expanded distribution control in all key U. S. industrial areas.

Box 758, Tooling & Production Magazine, 1975 Lee Rd., Cleveland, Ohio

DESIGNED FOR HEAVY DUTY BUILT TO TAKE IT!

O-M Series TH
Hydraulic (oil) Cylinder
2000 psi operation
3000 psi Non-Shock
available in 1½ to 8" bores
Meets JIC Standards

Every engineering and construction detail of the improved O-M Tie-rod Hydraulic Cylinder adds to its overall operating efficiency under heavy work loads, assuring maximum smooth performance with minimum maintenance. It is ruggedly constructed of heavy walled, seamless steel tubing microhoned to minimize friction. The rolled steel heads are recessed to confine the tube, prevent breathing and to provide additional protection against leakage under the most severe conditions. Heads can be rotated independently at 90° intervals for convenient port location. The piston rod is of stress relieved, high tensile steel, hard chrome plated turned, ground and polished. The rod gland cartridge that is threaded for quick, easy removal, is accurately piloted in rod head to assure perfect alignment, also serves as pilot for cylinder mounted on rod end. Rod gland contains extra long bronze rod bearing for maximum support of piston rod.

Vee type, non adjustable, self compensating, rod gland packing provides multiple lip seal. Cartridge "O" ring, with leather back up furnishes a positive seal. Rod wiper or interchangeable metallic scraper prevent dirt from entering cylinder on "in" stroke. A complete selection of mounts is available.

These and many other features are described in detail in our latest catalog No. 105. Write for your copy TODAY or consult your local O-M representative.

ORTMAN-MILLER MACHINE CO

21 143rd Street, Hammond, Indiana

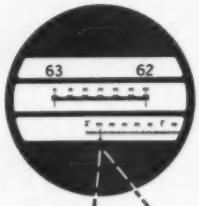
☐ Have representative call
☐ Send Bulletin 105

Name_____ Position_____
Company_____
Address_____
City_____ Zone_____ State_____

CIRCLE INFORM-A-GRAM KEY NO. 1173

BENTLEY
10 YEARS OF DEPENDABLE SERVICE TO INDUSTRY

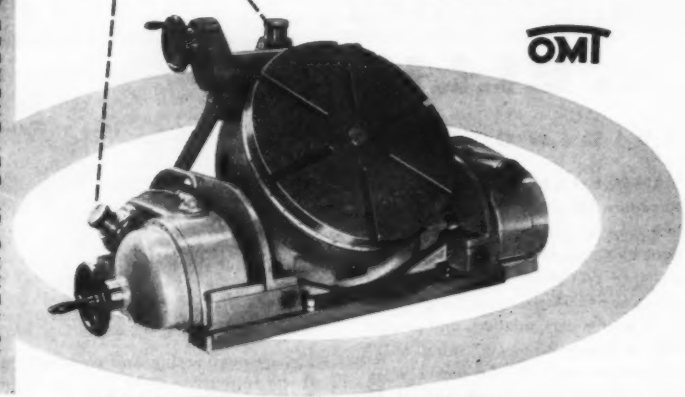
when one second is vital . . .



In inspection or production of compound angles, only the NEW O.M.T. 12" and 16" fully optical rotary and inclinable table offers direct scale readings to one second of arc for both movements. Twin eyepiece facilitates reading of rotary scale in elevated position.

Choose from a range of 9 hand and power operated tables from 10" to 30".

Favorable Deliveries!



Write for FREE illustrated brochure and prices.

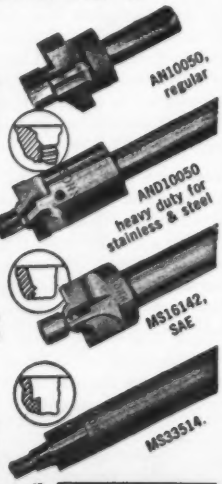
BENTLEY INDUSTRIAL CORP.

41 East 42nd St., Dept. A-8, New York 17, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 1181

WHY BUY SPECIALS?

Use standard cutters for popular hydraulic port contours



One pass completes all operations necessary to produce the port contour. Job time cut as much as ⅗! All have carbide cutting edges for long life, smooth finishes. Available in all sizes. Write for prices.

SONNET Tool and Mfg. Co.
576 North Prairie Avenue
Hawthorne California

CIRCLE INFORM-A-GRAM KEY NO. 1182

DIXON ONE-MAN COIL GRAB
CUTS TIME AND COSTS WITH ONE-MOTION REEL LOADING

Saves labor and speeds coil handling. One man can lift, turn, and load coil with a single, easy motion. Positive grip and support eliminate coil damage, assure operator safety. Forged steel wedge separates coils easily. Standard sizes up to 15,000 lb. capacity available from stock.

Lifts and turns in one motion.

WRITE FOR COMPLETE DATA—New bulletins illustrate standard models and show how to handle all coil sizes safely, rapidly, without damage. Write for them today.

DIXON AUTOMATIC TOOL, Inc.
2318 - 23rd AVENUE
ROCKFORD, ILLINOIS
Equipment for Automatic Parts Handling and Assembly

CIRCLE INFORM-A-GRAM KEY NO. 1183

LIFTING DEVICES
for
FAST • SAFE • BETTER
Material Handling
of
• SHEETS
• COILS • BOXES
• MOLDS
• DRUMS • PALLETS
400 MODELS

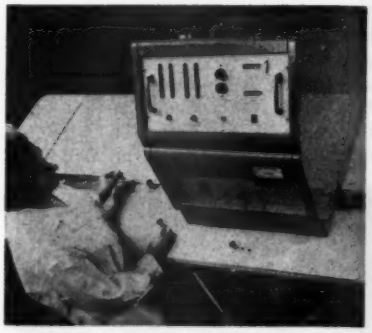
H. L. BUSHMAN CO. 100 West Central Ave. Roselle, Illinois

CIRCLE INFORM-A-GRAM KEY NO. 1184

ATOMIC ENERGY FINDS A JOB IN METALWORKING

Possible uses of atomic energy in manufacturing have been discussed before, but until the "Atomonitor" came along recently, applications for metalworking were nil. This one works, and has potential value for many inspection jobs.

The first Atomonitor, built by Nuclear Corp. of America for the Army Ordnance Corps, inspects production-line artillery-shell fuse heads to make sure hidden vital firing pins are present in the assemblies. Almost any relatively small assembly in which the vital part cannot be seen or felt once the assembly is complete can be inspected with similar units.



The parts being "looked for" are plated with 1/100 of a microcurie of radioactive silver, which is inexpensive, easy to apply, long-lived, and not harmful to health. Assemblies to be inspected are sent via conveyor through the Atomonitor. A scintillator (geiger counter) in it checks each piece for the presence of radioactivity. If it finds none, it automatically ejects the assembly into a bin below. Counters on the machine's control panel indicate how many units have been inspected and how many rejected. If desired, the machine also will keep track of the rejection rate and ring an alarm if it exceeds a predetermined maximum.

Formerly, fuse head assemblies were inspected by shaking them and listening for a certain click which indicated that the firing pin was seated properly. The new way is accurate 9,999,999 times out of 10-million.

———•———

Prompt delivery of its adjustable and magnetic die parts is provided by S. B. Whistler & Sons, Inc., who now stocks standardized round punches and die bushings from 0.062" to ½" in 0.001" increments. The range will soon be expanded to include larger sizes.

NEW LOW COST LEAD SCREW TAPPER

with . . .

PUSH BUTTON

operating control

- **Produces Gauge Perfect Parts.**
- **Eliminates parts spoilage, inspection.**
- **Saves Taps, Reduces Fixture Costs.**
- **Fast, Economical, 6-way Operating Action.**

Here is truly the most accurate, most precise, cost-cutting tapper on the market! New, different, flexible, it can be operated with push button and foot control for cycle or jog, automatic or with switch in fixture for full cycle. Either way, it provides a *uniformity, speed* and *precision accuracy* that's unparalleled!

Easy to Operate — Pays for Itself!

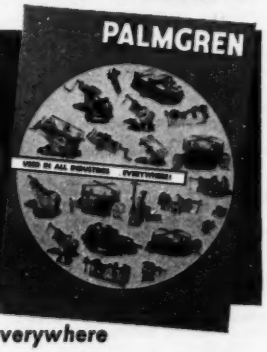
Push button releases electrically controlled air pressure engaging sensitive friction clutch which actuates lead screw. The tap, completely controlled by lead screw, is fed gently, automatically without pressure. The result is repetitive uniformity and precision that never varies! Tests proved all tapped parts passed 100% inspection—without rejects!

Write for FREE Brochure for complete details!

PROCUNIER SAFETY CHUCK COMPANY
12-14 SOUTH CLINTON STREET, CHICAGO, ILLINOIS, DEPT. 8
CIRCLE INFORM-A-GRAM KEY NO. 1191

PALMGREN

GET THIS FREE CATALOG on Work Holding Tools NOW!



Used in all industries . . . everywhere

This catalog shows the most complete line of work holding tools available anywhere for production on milling machines and drill presses . . . angle vises . . . drill press vises . . . swivel machine vises . . . adjustable angle plates with or without swivel bases . . . production vises . . . heavy duty angle vises . . . rotary and indexing tables for use on milling machines and drill presses . . . milling attachments for milling on lathes.

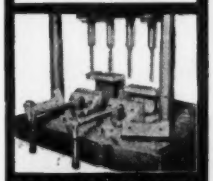
There are 68 different models and types of Palmgren vises, rotary tables, milling attachments and other machine tool accessories, with jaw sizes from 1½" to 8". Ask for your copy of this FREE Catalog No. 205 today, showing the complete line, details and prices.

125

CHICAGO TOOL and ENGINEERING CO.
8388 SOUTH CHICAGO AVE. • CHICAGO 17, ILLINOIS
CIRCLE INFORM-A-GRAM KEY NO. 1192

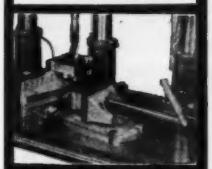
CUT PRODUCTION COSTS 50%

MULTIPLE DRILLING



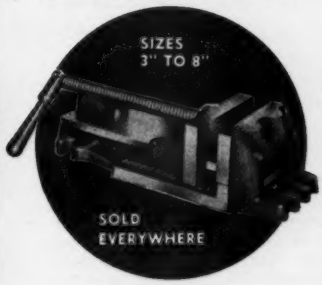
TWO SPEED VISES HANDLE DIFFERENT JOBS AT THE SAME TIME.

LARGE WORK



NEW LARGER MODELS PROVIDE SAME SPEED VISE ECONOMY FOR WORK ON HEAVIER MACHINES.

SPEED VISE



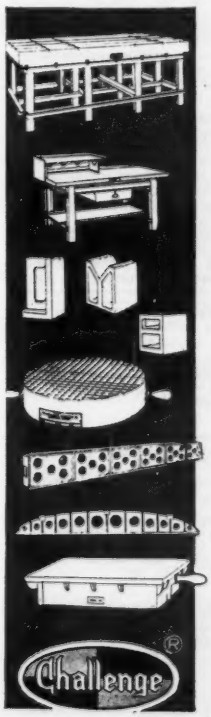
Save 50% on tooling costs with simple, inexpensive jigs in a SPEED VISE. Double your drilling capacity! The cost of the SPEED VISE is very low.

SEND FOR OUR NEW CATALOG

CARDINAL MACHINE CO.
1819 DANA ST. • GLENDALE, CALIF. SPEED VISE
CIRCLE INFORM-A-GRAM KEY NO. 1193

Over ~~300~~ 400 types and sizes of

PRECISION SURFACES



for LAYOUT, INSPECTION and ASSEMBLY

In Semi-Steel, Granite, Aluminum and Magnesium

Close tolerance precision work demands Precision Surfaces, and Challenge offers the broadest line of standard precision items to meet almost every precision need. This includes Angle Plates, V-Blocks, Straight Edges, Surface Plates and Floor Plates plus new lightweight Aluminum and Magnesium units. In addition, special types and sizes of precision surface equipment can be made to meet specific needs.

SE-116A

Ask for catalog information including complete specifications and prices. See your Industrial Distributor or write Challenge today.

Dept. TP-8
THE CHALLENGE MACHINERY CO.
Grand Haven, Michigan
CIRCLE INFORM-A-GRAM KEY NO. 1194

CUMULATIVE EDITORIAL INDEX FOR 1958 ISSUES

TOOLING & PRODUCTION Magazine

The number of subjects in which T&P's editors present material in just a few issues adds up very rapidly. Most articles are of lasting interest and have future reference value in solving tooling and production problems.

This cumulative index will build up progressively during each calendar year. Each issue will carry a cumulative index of material contained in all previous issues of the same year, with each January issue carrying the complete index of the twelve issues of the previous year.

We suggest you see to it that your copies of T&P are retained for future reference so you can get the full benefit of this new, unique and useful index.

The Publisher

SUBJECT INDEX

Abrasives, coated, performance factors of, Jan. p. 87 (4 pp)

Adhesives
Bonding, for carbide tip attaching to steel, Apr. p. 83.

Air Power
Valves for press safety, July, p. 42 (2¾ pp)

Alloys, high temperature, formed by high-impact-spin technique, Jan. p. 78 (4 pp)

Assembly (also see Welding, etc.)
Facilities for stamped components, Apr. p. 87 (4 pp)

ASTE Tool Show
Technical Conferences, Apr. p. 96 (2½ pp)
Tool show previews, Apr. p. 100 (8 pp)

Automation line, tape controlled, Apr. p. 94 (2 pp)

Bearings
Bushings, pilot, live roller, Mar. p. 65 (3 pp)
Inventory reduction of, Mar. p. 73 (1½ pp)
Life, improvement of, Mar. p. 74 (¾ p)
Sliding, behavior of, July, p. 38 (4 pp)

Bending
Tubing, cold bending vs hot bending, July, p. 48 (3 pp)

Boring
Heavy parts, setup for, Apr. p. 71 (4 pp)
Jig, horizontal, Mar. p. 57 (4 pp)

Brazing
Carbide tip attachment to steel by, Apr. p. 85
Honeycomb fabrication by, Jan. p. 73 (4½ pp)

Bushings, pilot, live roller, Mar. p. 65 (3 pp)

Carbide
Drills, application and maintenance of, Apr. p. 75 (5 pp)
Milling steel on low-horsepower machines, Feb. p. 83 (5 pp)
Pilot bushings for improved life, Mar. p. 65 (3 pp)
Throwaway insert standards, Feb. p. 79 (2½ pp)
Tips, methods for attaching to steel shanks, Apr. p. 83 (4 pp)
Tools, diamond grinding wheels for, Feb. p. 67 (12 pp)
Tools, new cutting materials for, Feb. p. 88 (5 pp)
Tooling, throwaway insert control, Feb. p. 79 (2½ pp)

Coated abrasives, performance factors of, Jan. p. 87 (4 pp)

Cold forming
Cold bending tubing vs hot bending, July, p. 48 (3 pp)
High temperature alloys, Jan. p. 78 (4 pp)
Importance to industry, Apr. p. 8 (2 pp)
Splines by low pressure rolling, June, p. 52 (1 p)

Contours
Intricate, optical inspection of, July, p. 45 (1 p)
Projector for production and inspection, Mar., p. 75 (2 pp)

Contouring, numerical control, vs. tracer control, Jan. p. 72 (½ p)

Control
Centralized, by production monitoring system, June, p. 45 (2 pp)
Electronic, for grinding needle bearings, Apr. p. 91 (2 pp)
Numerical, application of, Mar., p. 84 (1 p)
Tape, for multi-station job-lot automation, Apr. p. 95 (2 pp)
Tracer vs. numerical control, Jan. p. 72 (½ p)

Conveyor, roller, use of, Apr. p. 71 (4 pp)

Coolants for diamond wheels, Feb. p. 67 (12 pp)

Cost cutting
Automatic programming for turret lathes, June, p. 49 (2 pp)
Parts identification, rubber stamps vs silk screen, June, p. 37 (3½ pp)
Plant-wise production control, for June, p. 45 (2 pp)
Univac integrates order processing, June, p. 123 (½ p)

Cutting tools
Carbide drills, sharpening of, Apr. p. 75 (5 pp)
Carbide insert milling cutters for low-horsepower machines, Feb. p. 83 (5 pp)
Gun drill applications, Jan. p. 67 (5¼ pp)
Materials, metallurgy of, Feb. p. 88 (5 pp)
Milling cutters, determining approach and runout of, Apr. p. 80 (3 pp)

Design clinic
Milling cutter for blind hole keyways, June, p. 41 (3¼ pp)

Diamonds, special report, use and conservation of, Feb. p. 67 (12 pp); correction of, Mar. p. 69 (1 p)

Dies
Progressive and transfer for high production, May, p. 66 (2¾ pp)
Progressive, for dieing machines, July, p. 46 (2 pp)

Dividing head, for measuring, 1/10th sec. of arc, June, p. 51 (1 p)

Drilling, gun application of, Jan. p. 67 (5¼ pp)

Drills
Carbide twist, application and maintenance of, Apr. p. 75 (5 pp)
Radial, for heavy work boring, Apr. p. 71 (4 pp)

Electronic machine, future application of, Mar. p. 51 (1 p)

Extruding metals, four methods for, Apr. p. 8 (2 pp)

Feeds and speeds for diamond wheels, Feb. p. 67 (12 pp)

Flatness, surface plates, measurement of, May, p. 69 (4½ pp)

Friction, sliding, affecting elements of, July, p. 38 (4 pp)

Fusion: a carbide tip attachment method, Apr. p. 86.

Gage blocks, creation, development, manufacture of, May, p. 63 (3 pp)

Gages
Automatic, for in-process control, May, p. 57 (5 pp)
Electronic, caliper for measuring in millionths, June, p. 47 (2 pp)
Gun Drill, construction of, Jan. p. 67 (5¼ pp)

Grinding and finishing
Angular grinding on surface grinders, Feb. p. 82 (1 p)
Control, continuous grinding, Apr. p. 91 (2 pp)
Diamond wheels for, Feb. p. 67 (12 pp)
Finish, checking smoothness of, Mar. p. 56 (1 p)
Gun drill cutting edges, Jan. p. 67 (5¼ pp)
Repetitive grinding to ±0.000010", June, p. 47 (2 pp)
Twist drills, carbide, Apr. p. 75 (5 pp)

Gun drilling, application of, Jan. p. 67 (5¼ pp)

Hole punching by grid layout, Jan. p. 110 (½ p)

Honeycomb sandwich structures, fabrication of, Jan. p. 73 (4½ pp)

Inspection
Contour projection for, Mar. p. 73 (1½ pp)
Data for determining machine capability, May, p. 51 (2½ pp)
Finish, checking smoothness of, Mar. p. 56 (1 p)
Optical, of intricate contours, July, p. 45 (1 p)

Interferometers, accurately measuring millionths with, May, p. 63 (3 pp)

Inventory, bearings, reduction of, Mar. p. 73 (1½ pp)

Jig boring, horizontal, Mar. p. 57 (4 pp)

Jigs and fixtures
Fixtures, trunnion, for heavy parts, Apr., p. 71 (4 pp)

Keyways
Blind hole, milling cutter for, June, p. 41 (3¼ pp)

Lathe
High precision headstock for, Jan. p. 82 (2 pp)

Turret, automatic programming for, June, p. 49 (2 pp)

Machines
Capabilities, determination of, May, p. 51 (2½ pp)
Obsolescence, guides to replacement, July, p. 9 (3½ pp)

Machine tools, replacement of, Feb. p. 65 (1 p)

Machining (also see specific process)
Horizontal jig boring, Mar. p. 57 (4 pp)

Maintenance
Numerical control equipment, training for, July, p. 35, (3 pp)

Management
Idle dollars, opportunities for, May, p. 49 (1 p)
Obsolescence, opportunity of, July, p. 9 (3½ pp)
Responsibilities delegated by, Mar. p. 53 (2½ pp)
Tomorrow's opportunities, planning for, May, p. 28 (1½ pp)
Training, effective pre-requisite for, June, p. 131 (2 pp)
Winning friends and influencing P.A.'s, June, p. 35 (1 p)

Materials
Cutting metals, evaluation of, June, p. 23 (1¾ pp)
Cutting tools, metallurgy of, Feb. p. 88 (5 pp)
Extruding, savings by, Apr. p. 8 (2 pp)

Measurement methods
Measuring 1/10th sec. of arc, dividing head for, June, p. 51 (1 p)
Standards for, May, p. 63 (3 pp)

Milling
Blind hole keyways, tooling for, June, p. 41 (3¼ pp)
Cutter approach and runout, determination of, Apr. p. 80 (3 pp)
Cutters, carbide inserts for low-horsepower machines, Feb. p. 83 (5 pp)
Machines, live bearings for, Mar. p. 65 (3 pp)

Numerical Control
Application of, Mar. p. 84, (1 p)
Equipment maintenance, training for, July, p. 35 (3 pp)

Obsolescence
Equipment replacement, guides to, July, p. 9 (3½ pp)

Parts identification, rubber stamps for, June, p. 37 (3½ pp)

Personnel
Maintenance training for numerical control, July, p. 35 (3 pp)

Planishing
Roll, for fusion welds, July, p. 122 (2 pp)

Plastic tooling, increased use of, Mar. p. 70 (1½ pp)

Presses
Automatic, for high production, Mar. p. 68 (1 p)
Automatic with transfer die, May, p. 66 (2¾ pp)
Safety, equipment for, July, p. 42, (2¾ pp)
Transfer, for deep drawing, Apr. p. 93 (1 p)

Production control
Plant-wise, for cost cutting, June, p. 45 (2 pp)

Programming
Automatic, for turret lathes, June, p. 49 (2 pp)

Quality control
Automakers examine quality control results, May, p. 54 (1½ pp)
Automatic gaging for, May, p. 57 (5 pp)
Machine capabilities, determination of, May, p. 51 (2½ pp)
Planning and training for, May, p. 55 (½ p)

Radial drill for heavy work boring, Apr. p. 71 (4 pp)

Research, industrial, evaluation of, Jan. p. 8 (3 pp)

Safety
Press, air clutch and brake for, July, p. 42 (2¾ pp)

Salvage, diamonds, program for, Feb. p. 67 (12 pp)

Small business, technical assistance for, Jan. p. 8 (3 pp)

Soldering, low temperature, carbide tip attachment method, Apr. p. 84

Speeds and feeds for carbide twist drills, Apr. p. 77

Spindles, precision, analysis of, Jan. p. 84 (2½ pp)

Spline rolling, advantages of, Apr. p. 22

Stampings
Assembled for complete units, Apr. p. 87 (4 pp)

Stamps, rubber, for parts identification, June, p. 37 (3½ pp)

Standard units form special stud driving machines, Mar. p. 78 (2 pp)

Standards for carbide throwaway insert tools, Feb. p 79 (2½ pp)

Steel, stainless, failure of, Mar. p. 55 (½ p)

Stud driving machines, special, from standard units, Mar. p. 78 (2 pp)

Surface plates, determining flatness of, May, p. 69 (4½ pp)

Surfaces
Sliding, friction of, July, p. 38 (4 pp)

Technology of this age, Feb. p. 22 (2½ pp)

Titanium, hot forming of, Jan. p. 172 (¾ p)

Tools
Jig boring, setup for, Mar. p. 57 (4 pp)
Precision, calibration of, May, p. 69 (4½ pp)
Toolmakers' square, Apr. p. 69 (1 p)
Wrenches, torque, for valve assembly, May, p. 62 (1 p)

Training
Effective, pre-requisite for, June, p. 131 (2 pp)
Plastic tooling in, Mar., p. 70 (1½ pp)

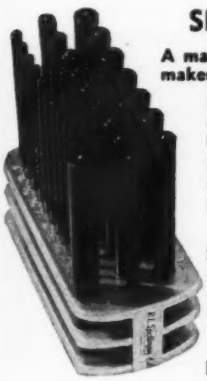
Trunnion fixture for heavy work handling, Apr. p. 71 (4 pp)

Valves
Air, for press safety control, July, p. 42 (2¾ pp)

Welding
Arc, automatic machines for, Mar. p. 61 (3½ pp)
CO_2, for die set construction, Mar. p. 71 (1½ pp)
Fusion and roll planishing, July, p. 122 (2 pp)
Mechanized continuous welder, portable, with controlled travel, May, p. 56 (1 p)
Projection for assembly fastening, Apr. p. 90
Spot and seam, for honeycomb fabrication, Jan. p. 73 (4½ pp)

Wheel trueing tools, diamond, special report on, Feb. p. 67 (12 pp); correction of, Mar. p. 69 (1 p)

Wrenches, torque, for valve assembly, May, p. 62 (1 p)



SPELLMACO SPOTTERS

A matched set of transfer punches for toolmakers, machinists and tool cribs.

Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel carefully heat treated and tempered for long life. .0025 undersize to facilitate use—black oxide finish.

Set No. 3-17: 28 punches with indexed stand—sizes 3/32" to ½" by 1/64" plus hand 17/32" size—length 4⅞". PRICE only $17.90

Single size available.

R. L. SPELLMAN CO. • Urbana, Ohio

CIRCLE INFORM-A-GRAM KEY NO. 1211

ONE RAM STROKE FORMS LARGE VESSEL CLOSURE

What is believed to be the largest, thickest and heaviest pressure vessel closure ever made at a single stroke by die-forming was recently completed by The Babcock & Wilcox Company. The closure will become the bottom head of a nuclear reactor vessel which will generate steam for electricity at the Indian Point, N. Y., station of the Consolidated Edison Company of New York.

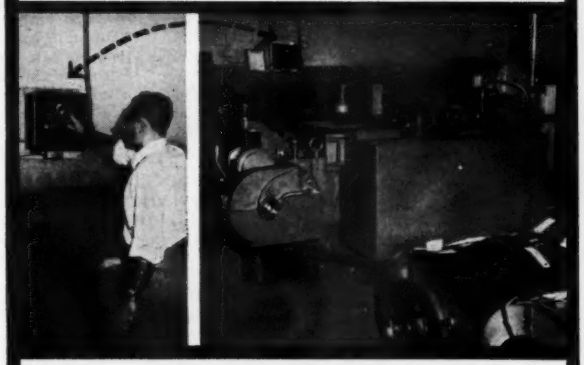
The head was pressed from a 58,646 lb. flat, circular plate of 70,000 psi tensile strength SA 212 Grade B carbon-silicon steel, 15′ in dia and $7\frac{15}{16}$″ thick. Before forming, the plate surface which was to become the inside of the head was clad by a patented B&W process with a 0.109″ layer of AISI type 304 stainless steel.

To make the plate workable, it was heated approximately six hrs to bring the temperature to 2000°F. It was then positioned between a 70-ton male die and a female die ring, supported by a 70,000 psi tensile strength cast steel die holder, on the 6500-ton vertical hydraulic press. The die setup, specially fabricated by B&W, weighed 140 tons.

A force of approximately 3300 tons was exerted to form the plate into a hemispherical shaped head with an outside diameter of 11′, ⅝″ and an inside diameter of 9′, 9″.

The Inform-A-Gram card which follows page 84 is for your convenience in making inquiries about advertised Products and Editorial items.

Protect Automatic Machinery



Sperry Monitron increases production, saves man-hours, protects cold-headers in the manufacture of General Electric Telechron Clocks

This cold-header automatically stamps out clock parts in complete safety. MONITRON will stop the machine the instant that it senses a load change, pile-up, misfeed, dull tool, oversize stock, faulty lubrication, etc.

MONITRON is easy to install... needs no attention... but gives electrically driven presses, conveyors, pumps, automatic machine tools, etc., *every* attention!

Write for complete information. Just attach this advertisement to your company letterhead, give your name and title, and mail to:

SPERRY PRODUCTS, INC.

406 Shelter Rock Road, Danbury, Conn.

CIRCLE INFORM-A-GRAM KEY NO. 1212

TECHNICAL BOOKS

MICROSTRUCTURES OF DIAMOND SURFACES by Tolansky. 11 chapters of original research in the field of diamond growth. New optical techniques explained. 143 special art plates. $8.50 per copy

DIAMOND TECHNOLOGY by Paul Grodzinski. 784 pages, 93 working tables, and over 486 photographs and drawings. The only standard work on the subject. $10.00 per copy

GEARS FOR SMALL MECHANISMS by W. O. Davis. 20 chapters profusely illustrated covering theory, design and practice of cutting and generating gear tooth forms. $5.00 per copy

COLD FORMING OF THE STAINLESS STEELS by Lester F. Spencer. A 28-page pamphlet on the subject. $1.00 per copy

MACHINING, HEAT TREATMENT & PICKLING OF STAINLESS by Lester F. Spencer. 36 pages on the working of stainless steel. $1.50 per copy

COMPANY PURCHASE ORDERS OR CASH, PLEASE. SORRY, NO C.O.D.'S

HUEBNER PUBLICATIONS, INC.

P.O. Box 3505, Cleveland 18, Ohio

CHIEF TOOL ENGINEER

Nationally known fastener manufacturer has opening for Chief Tool Engineer. Candidates must have supervisory tool engineering experience in heading or press cold forming work. Pennsylvania location. Five figure salary.

Write box 858, TOOLING & PRODUCTION Magazine, 1975 Lee Road, Cleveland 18, Ohio.

ADVERTISERS' INDEX

A. I. T. Diamond Tool Company 99
Ace Drill Corporation 96
Acme Industrial Co. 124
Acme Tool Corp. 124
Aget Manufacturing Co. 115
Alina Corporation 61, 116
Aluminum Co. of America 126
Allegheny Ludlum Steel Corp. 85
Aloris Tool Co., Inc. 97
American Brass Co. 31
American Drill Bushing Co. 19
Armstrong-Blum Mfg. Co. 102
Armstrong Bros. Tool Co. 108
Arrow Tool & Reamer Company 116

Balas Collet Mfg. Company 7
Bausch & Lomb Optical Co. 73
Bay State Abrasive Products Co. 125
Bearings, Incorporated 16
Bellows Company 21
Benchmaster Mfg. Company 88
Bentley Industrial Corp. 118
Edward Blake Co. 75
Blanchard Machine Co. 23
E. W. Bliss Co. 115
Branch Manufacturing Company 94
H. L. Bushman Co., Inc. 118

Capewell Mfg. Co. 75
Cardinal Machine Co. 119
Central Safety Equipment Co. 104
Challenge Machinery Company 119
Chicago Tool & Engrg. Company 119
Cincinnati Milling Machine Co., The 53
Robert H. Clark Company 100
Clearing Machine Corp.,
Div. of U. S. Industries, Inc. 62, 63
Comtor Company 112
Lawrence H. Cook, Inc. 100

Dalzen Manufacturing Company 113
Dayton Rogers Mfg. Co. 94
J. Arthur Deakin & Son 100
Detroit Power Screwdriver Co. 86
Detroit Reamer & Tool Co. 8
George L. Detterbeck Company 112
DeVlieg Microbore Div., DeVlieg Mach. Co. 67
H. E. Dickerman Mfg. Co. 83
Dixon Automatic Tool, Inc. 118
The DoAll Company 17
Drillmation Company 111
The Dykem Company 116

Eastern Machine Screw Corp. 92
Eclipse Counterbore Co. 30
Ehrhardt Tool & Machine Co. 24
Eisler Engineering Co., Inc. 124
Emhart Mfg. Co.—V & O Press Div. 6
Engelhard Industries, Inc. 107
Erickson Tool Co. 34

The Federal Press Co. 109
Feedall, Incorporated 89

Gaertner Scientific Corp. 103
Gage Company 108
Gallmeyer & Livingston Co. 116
Gatco Rotary Bushings Co. 88
Gisholt Machine Co. 81
Gray Equipment Company 110
Gries Reproducer Corp. 124
Grip Nut Company 94

Hamilton Tool Company 93, 95
Hardinge Brothers, Inc. 3
Hartford Special Machinery Co. 14
Heimann Mfg. Company 81
Hill Acme Company 108
Huebner Publications, Inc. 121, 123
K. H. Huppert Co. 100
Wm. T. Hutchinson Co. 111
Hydraulic Press Mfg. Co. 13

Index Machine Company 98
Indiana Commercial Filters Co. 80

Jergens Tool Specialty Co. 88
Johnson Gas Appliance Co. 72
Jones & Lamson Machine Co. 12

Kearney & Trecker Corp. 68
Kidde Precision Tool Corp. 117, 124

ADVERTISING REPRESENTATIVES

CHICAGO 1: Robert R. Pierson, 333 N. Michigan Ave., FRanklin 2-4811

CLEVELAND 18: Jerry J. Miller, 1975 Lee Rd., FAirmount 1-4040

DETROIT 2: R. F. Pickrell, Larry Pickrell, 318 Stephenson Bldg., TRinity 1-0790

NEW YORK: Philip N. Meade, 60 E. 42nd Street, Room 411, New York 17, N. Y., YUkon 6-7695

NEW ENGLAND: R. N. Jorgenson, P. O. Box 55, Granby, Conn. OLdfield 3-6759

WEST COAST: M. D. Pugh & Assocs. Los Angeles 32: M. D. Pugh, Donn Pugh, P. O. Box 32188 CApitol 2-8857

Palo Alto: Hunter Vinton 1050 Lincoln Avenue DAvenport 5-4815

Lamina Dies & Tools, Inc. 36
Lapeer Mfg. Co. 99
Louis Levin & Son, Inc. 91
F. J. Littell Machine Co. 65
Logansport Machine Co., Inc. 15
Lovejoy Tool Company, Inc. 78

Marcellus Mfg. Co. 104
Mead Specialties Company 99
Metal Carbides Corp. 26
Mettler Machine Tool, Inc. 112
W. F. Meyers Co., Inc. 77
Michigan Tool Co. 59
Micromatic Hone Corp. 70, 71
Micrometrical Mfg. Co. 58
Mohawk Tools, Inc. 11
Moline Tool Company 66
Moore Special Tool Co., Inc. 10

The National Acme Co. 20
National Tool Salvage Co. 115
Nichols-Morris Corporation 117
Nicholson File Co. 27
The Norton Company 28

Ohio Knife Company 91
O'Neil-Irwin Mfg. Co. 9
Opto-Metric Tools, Inc. 77
Ortman-Miller Machine Co. 117

Parker-Majestic, Inc. 79
Petz-Emery, Inc. 72
Portage Machine Co. 18
Potter & Johnston Company 57
Pratt & Whitney Company 54, 55
Procunier Safety Chuck Co. 119
Producto Machine Company 72
Putnam Tool Company 84

Raymond Mfg. Co. 94
Reid Tool Supply Co. 75
Rice Pump & Machine Co. 103
J. A. Richards Company 107
Roto-Finish Co. 64
Rotor Tool Co. 32

George Scherr Co. 99
Schrillo Engineering Co. 60
Scully-Jones & Co. 103
Service Machine Company 107
Severance Tool Industries 91
Shore Instrument & Mfg. Co. 111
Silber Products, Inc. 115
Snyder Tool & Engrg. Co. 2
Sonnet Tool & Mfg. Co. 118
R. L. Spellman Co. 121
Sperry Products, Inc. 121
Standard Tool Co. 92
Star Jack Co. 100
Star Stainless Screw Co. 124
Superior Steel Products Corp. 82
Syntron Company 76

The Tannewitz Works 104
Timken Roller Bearing Co. 22
Tomco Products Co. 107
Tomkins-Johnson Co. 101
Trico Fuse Mfg. Co. 72
True-Trace Sales Corp. 105

United States Diamond Wheel Co. 4, 117
U. S. Industries, Inc.,
Clearing Machine Corp., Div. 62, 63
Universal Engineering Co. 25

V & O Press Div., Emhart Mfg. Co. 6
Vascoloy-Ramet Corp. 5
Vernon Devices, Inc. 108
Versa Products, Inc. 88
Vlier Engineering Corp. 87
Vulcan Tool Co. 77

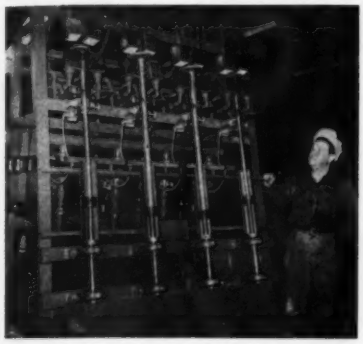
Ward Machinery Co. 97
Wardwell Mfg. Co. 107
Watts Brothers Tool Co. 124
Western Tool & Mfg. Co. 112
Wheelock, Lovejoy & Co. 74
S. B. Whistler & Sons, Inc. 97
Wisconsin Drill Head Co. 106

Yoder Company 92

NEW GAS-FIRED UNIT DRAWS AXLE FLANGES

In order to prepare truck axle shaft flanges for machining and drilling after the shafts have been hardened, International Harvester has installed a 4-station, adjustable "Flame Draw" unit in their Fort Wayne motor truck plant.

The Flame Draw unit, designed and built by Gas Appliance Service, Inc., consists of gas-fired units that heat the flanges of the previously hardened pieces to 1400°F without allowing heat to creep into the shaft.



Four "Zig-Zag" rapid heating, internal combustion type burners that combine high flame temperature with maximum heat output, are installed at each station. A Furkert gas-air mixer supplies the accurately premixed gas-air mixture at 32 oz outlet pressure. The pieces are rotated while in the heat zone.

As the shaft is inserted at each station, it actuates an automatic timer, which causes the burners to go on "high fire"; at the end of the pre-set heating cycle, the timer throttles the burners and flashes a signal light. The shaft is then removed by the operator. The heated shafts cool in air.

———•———

Three new midwest sales offices of Michigan Tool Co. have been opened to provide closer direct contact between user and supplier. The offices are located in Chicago, Milwaukee, and Indianapolis. A Moline, Ill., office, part of the Chicago operation, will serve portions of the Illinois-Iowa area.

———•———

The Abrasives Div'n of The Elgin National Watch Co. announces a diamond reclamation service. They will either assay the diamond bearing sludge and buy it outright, or clean it and return the diamond content. A compounding service for reclaimed material is also available.

TECHNICAL BOOKS

HUEBNER PUBLICATIONS, INC.
1975 LEE ROAD. CLEVELAND 18, OHIO

Gentlemen: Please send me the publications I have checked.

☐ **DIE DESIGNING AND ESTIMATING**
Fourth edition. 368 pages, 26 chapters, and over 400 illustrations, drawings, charts and graphs. Extensively revised and enlarged plus a special section of 165 Practical Points in Die Design and Construction. Completely indexed.
_____copies @ $7.50 per copy. Total $_____

☐ **MICROSTRUCTURES OF DIAMOND SURFACES**
By S. Tolansky. 11 chapters of original research in the field of diamond growth. New optical techniques explained and illustrated which enable height or depth features as small as one twenty-five millionth of an inch to be resolved and magnifications in depth of half a million times to be made. 143 special art plates.
_____copies @ $8.50 per copy. Total $_____

☐ **DIAMOND TOOLS**
By Paul Grodzinski. A 379-page handbook on the industrial use of diamonds. Case histories and illustrations describe those applications in which the diamond has proved the most satisfactory tool in performance, precision and economy.
_____copies @ $4.50 per copy. Total $_____

☐ **DIAMOND TECHNOLOGY**
By Paul Grodzinski. The only standard work on the subject and the only book of its kind in technical literature. 784 pages, 93 working tables, and over 486 photographs and drawings.
_____ copies @ $10.00 per copy. Total $_____

☐ **GEARS for Small Mechanisms**
By W. O. Davis. 20 chapters, profusely illustrated covering everything from The Theory and Practice of the Design of Very Small Gears to The Design of Tools for Cutting and Generating Gear Tooth Forms.
_____copies @ $5.00 per copy. Total $_____

☐ **TREATISE ON MILLING AND MILLING MACHINES**
By The Cincinnati Milling Machine Co. Gives you the answer to practically every metalworking problem in the field of milling from the toolroom to fixture design and high production milling. 896 pages, over 200 formulas and 700 illustrations and charts.
_____copies @ $8.00 per copy. Total $_____

☐ **THE PRINCIPLES OF INVENTORY MANAGEMENT that Lead to Higher Profits**
By Nyles V. Reinfeld. An authoritative 32-page treatise on the economic aspects of analysis within your existent inventory control system. Includes order quantity analysis, re-order point analysis, marginal analysis and safety allowances in continuous production.
_____copies @ $2.00 per copy. Total $_____

☐ **COLD FORMING OF THE STAINLESS STEELS**
By Lester F. Spencer. 28 pages of KNOW-HOW on the blanking, punching, perforating, and bending, forming, deep drawing and spinning of the stainless steels.
_____copies @ $1.00 per copy. Total $_____

☐ **MACHINING, HEAT TREATMENT & PICKLING OF THE STAINLESS STEELS**
By Lester F. Spencer. 36 pages on the working of stainless — including drilling, tapping, threading, reaming, skiving, milling, broaching and shaving, plus heating and quenching procedures.
_____copies @ $1.50 per copy. Total $_____

TOTAL AMT. OF ORDER $ _____

Check, money order or cash with order, please. Open account shipments on company purchase orders when total amount exceeds $3.00. No C.O.D.'s please. Ohio customers add 3% sales tax. Quantity Prices quoted on request.

COMPANY_____

BY_____TITLE_____

ADDRESS_____

CITY_____ZONE_____STATE_____

ACME *deluxe model* solid tungsten carbide drill jig **BUSHING**

WEARS 50 TIMES LONGER...

- Made in all types of A.S.A. standards
- Made to your special requirements
- Manufactured with full drill bearing surface

ACME INDUSTRIAL CO.
235 N. Laflin St., Chicago 7, Ill.

Please send price information and location of my nearest distributor.

Name_____
Firm Name_____
Address_____
City_____ State_____

CIRCLE INFORM-A-GRAM KEY NO. 1241

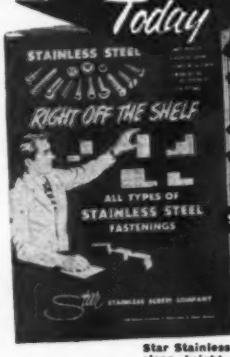
DEPENDABLE ACCURACY

INSPECTION TOOLS made of MEEHANITE METAL are designed to fill your various Inspection and Checking needs. Sturdily constructed to give you reliable, accurate service.

ACME TOOL CORP.
75 W. Broadway New York 7, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 1242

WRITE, WIRE or PHONE FOR YOUR CATALOG *Today*



BOLTS & CAP SCREWS
SOCKET, SET & CAP
NUTS, WASHERS
MACHINE SCREWS
SHEET METAL SCREWS
WOOD SCREWS
PIPE FITTINGS

Star Stainless screws have clean—bright and—shiny—heads

STAR STAINLESS SCREW CO.
CORROSION RESISTANT
579 Union Blvd., Paterson 2, N. J.
Telephone: CLifford 6-2300
Direct N. Y. Phone: WI 7-9041
Direct Phila. Phone: WA 5-3660

CIRCLE INFORM-A-GRAM KEY NO. 1244

CAMS ALL TYPES MADE TO YOUR SPECS

Dr. Chas. Eisler ME, Founder
Chas. Eisler, Jr., Pres.

EISLER ENGINEERING CO., INC.
732 SO. 13TH ST. NEWARK 3, N. J.

CIRCLE INFORM-A-GRAM KEY NO. 1244

DRILL THESE HOLES
BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature.
WATTS BROS. TOOL WORKS
Wilmerding, Penna.

CIRCLE INFORM-A-GRAM KEY NO. 1245

GRC
DIE CAST & MOLDED NYLON
Fasteners
AT LOWER COST

Die Cast Zinc Alloy Wing, Cap & Thumb Nuts; Wing & Thumb Screws, Molded Nylon Screws, Washers & Screw Insulators.

Widest range of sizes and types . . . new kinds of fasteners never before available from stock . . . automatically produced to assure uniformity, quality and economy.

Write NOW for Catalog.

GRIES REPRODUCER CORP. GRIES
World's Foremost Producer of Small Die Castings
44 Second Street, New Rochelle, N. Y.
NEw Rochelle 3-8600

CIRCLE INFORM-A-GRAM KEY NO. 1246

JIG BORING
and
Large Precision Machining
Done to your specifications
We Have
22 Jig Borers
KIDDE PRECISION TOOL CORPORATION
10 Locust Ave., Roseland, N. J.

CIRCLE INFORM-A-GRAM KEY NO. 1247

WHAT'S NEW IN PLASTICS?

A Manual includes technical data bulletins on several of the more popular grades of IC polyester resins. Information on IC color concentrates, filled resins, binders, and other accessories is presented in chart form. Applications and characteristics are included. Write to Interchemical Corp., Finishes Div'n, 1754 Dana Ave., Cincinnati 7, for your polyester resins technical bulletins, or — **Circle Inform-A-Gram No. E1.**

Small-Type Air-Powered Hydraulic Presses for plastics and rubber molders are described in a bulletin. These Elmes Hydrolairs are true oil-hydraulic presses without motors or pumps; their special hydraulic intensifier being powered solely by compressed air. They are ideal for plastics and rubber molding, laminating, compacting, gluing, and assembly forcing. For copies of Bulletin 1036-C, write Elmes Engineering Div'n, American Steel Foundries, 1150 Tennessee Ave., Cincinnati 29, or—**Circle Inform-A-Gram No. E2.**

Use a Group of Metal-Filled Epoxy Resins for making strong castings with properties similar to metal castings; making molds for short run use; and filling voids and plugging holes in all metal structures, wood, and plastics. Stabond EP series has excellent machining properties and EP-104 is designed for filling honeycomb structures for insertion of bolts and hangers. For more information, write to American Latex Producers Corp., 3341 W. El Segundo Blvd., Hawthorne, Calif., or — **No. E3.**

How Earl Singleton* cut the cost of grinding heavy traction gears

He started by specifying a 14" wheel that cost 14% less than its predecessor *and* held form better. Then he tried a 15" wheel, figuring that a slightly larger wheel might also grind more pieces per wheel. It did. After stringent safety tests, the 15" wheel was put to work and more than doubled production . . . from 16-17 pieces to 35-36 per wheel. Down time was cut, too.

Like Earl Singleton, *your* Bay State distributor may help cut costs in ways you haven't tried. Why not see what he can do? *Better grinding at lower cost . . . that is his business.*

*Abrasive Engineer with Bay State distributor Browning Tool & Supply Co., Indianapolis.

Bay State specification cut wheel cost 14% . . . *and* wheel held form so well that wheel life was doubled under regular production conditions.

BAY STATE WHEELS of PROGRESS

BAY STATE ABRASIVES

Bay State Abrasive Products Co., Westboro, Massachusetts.
Branch Offices and Warehouses: Bristol, Conn., Chicago, Cleveland, Detroit, Pittsburgh. *In Canada:* Bay State Abrasive Products Co. Ltd., Brantford, Ontario. *Distributors:* All principal cities.

CIRCLE INFORM-A-GRAM KEY NO. 125

HUEBNER PUBLICATIONS, INC.
1975 Lee Rd., Cleveland 18, O.

FORM 3579 REQUESTED

SWITCH TO ALCOA ALUMINUM TOOLING PLATE... TRIPLE JIG, DIE AND TOOL PRODUCTION WITH LESS LABOR

That's a mighty big order for any shop, but Alcoa® Aluminum Tooling Plate and Alcoa Tool and Jig Plate can fill it. Here's a case in point. You can make three times as many core blower plates from 100 pounds of Alcoa Tool and Jig Plate as compared to the number obtainable from 100 pounds of conventional tooling plate. Now add these other savings: aluminum machines three times faster with better accuracy . . . machines and tools last longer . . . less maintenance is required. *Slash Labor Costs as Much as 60 Per Cent.* Along with aluminum's high-speed machining characteristics, you get all-important light weight for savings in handling. Because it weighs but one-third as much as iron or steel, changeovers are reduced to a one-man job. An aluminum jig takes less time and work to open, close, move, store or set up.

Call Your Local Alcoa Distributor. Order locally from a wide selection of sizes and gages, cast or rolled. Alcoa Tool and Jig Plate is ideal for high-precision tooling needs. Alcoa 6061-T6 Tooling Plate is a wrought aluminum plate for high-strength utility requirements.

ALCOA ALUMINUM

Your Guide to the Best in Aluminum Value

Aluminum Company of America
1992-H Alcoa Building, Pittsburgh 19, Pa.

re or

from
lcon
oling
umi-

Value

rica
9, Pa.